CENTER FOR TRUSTWORTHY SCIENTIFIC CYBERINFRASTRUCTURE

The NSF Cybersecurity Center of Excellence

Welcome to the CCoE Webinar Series. Our topic today is Technology Transfer to Practice: The NSF TTP Ecosystem with Emily Nichols & Alec Yasinsac. Our host is Jeannette Dopheide.

The meeting will begin shortly. Participants are muted. You may type questions into the chat box during the presentation.

This meeting will be recorded.

The CTSC Webinar Series is supported by National Science Foundation grant #1547272.

Technology Transfer To Practice

The NSF TTP Ecosystem

*Emily Nichols and **Alec Yasinsac

5/24/2016

* Innovation Program Manager, Internet2

**School of Computing, University of South Alabama

Promoting and Resourcing TTP for Academic Products

1. Academic PIs
   - Familiarization
   - Training
   - Advising

   >> University of South Alabama

2. Infrastructure PIs
   - Familiarization
   - Recruitment
   - Training

   >> Internet2

Promoting the NSF-SATC TTP Designation

- Component of the regular SATC solicitation
- Transition existing research results to practice
- The operational environment can be:
  - Commercial, Government, Academia

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EAGER: Cybersecurity Transition to Practice (TTP) Acceleration
NSF Cybersecurity Center of Excellence Webinar, May 22, 2017

PRESENTED BY: Emily Nichols, Innovation Program Manager, Internet2

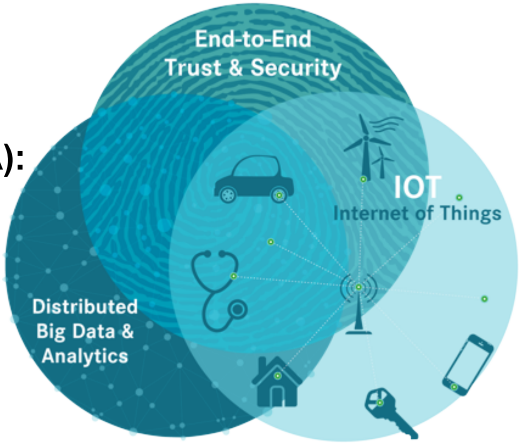
End-to-End Trust & Security was one of the top three focal areas identified in a May 2015 Internet2 member innovation survey.

E2E Trust & Security (E2ET&S):

- TIPPSS for IoT – Trust, Identity, Privacy, Protection, Safety, Security
- NSF EAGER Cybersecurity Transition to Practice (TTP) Acceleration
- SDP (Software Defined Perimeter), Network Segmentation for IoT

Distributed Big Data & Analytics (DBDA):

- Health & Life Sciences / Genomics
- Smart Campuses and Cities
- NSF Big Data Hub Collaboration

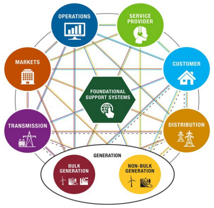


Internet of Things (IoT):

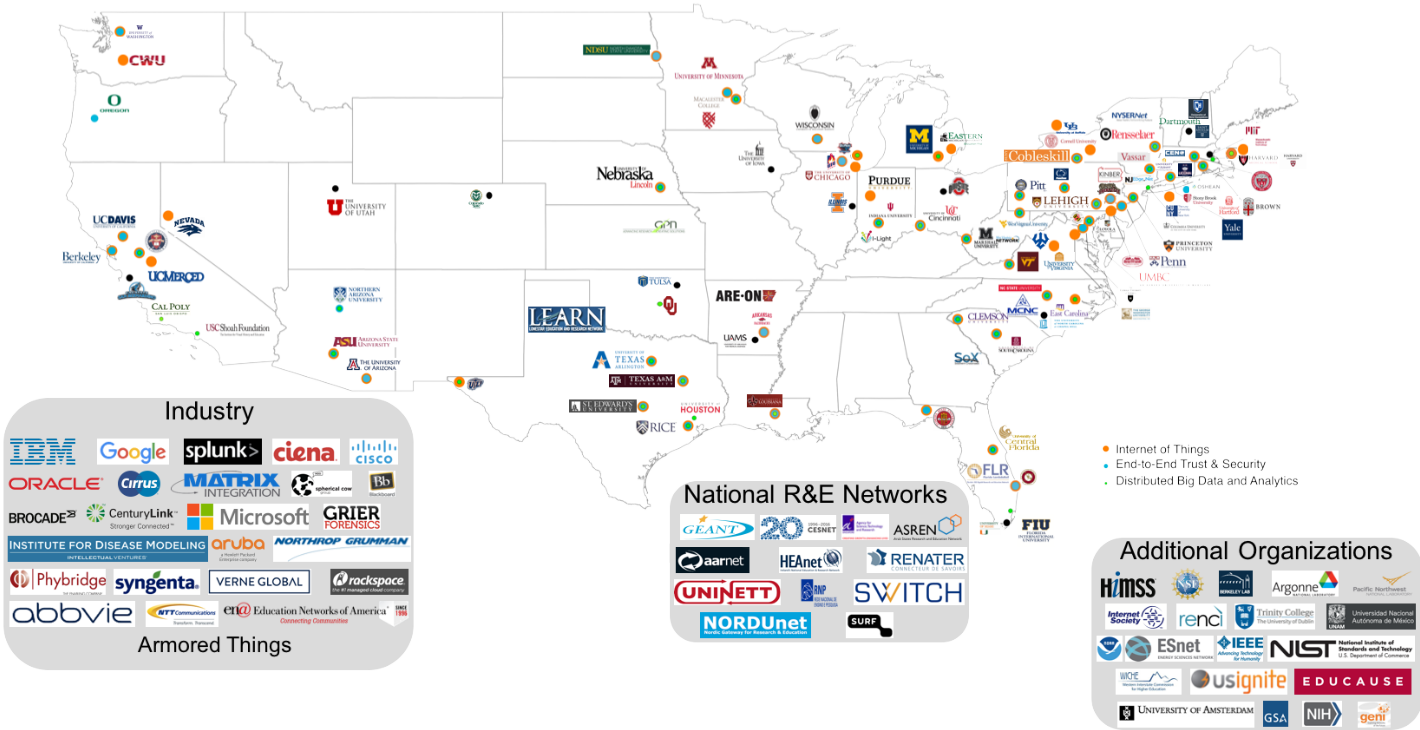
- IoT Sandbox
- Smart Campuses and Cities
- Smart Grid Testbed

Collaborative Innovation Community (CINC UP) includes Special Interest Groups pertinent to use cases identified by members.

- Smart Campus
- Smart Grid
- IoT Ethics
- Trust, Identity, Privacy, Protection, Safety & Security (TIPPSS) for IoT
- Cybersecurity TTP
- Healthcare & Life Sciences / Genomics



Internet2 Collaborative Innovation Community has grown to 370+ individuals representing 160+ institutions that can be leveraged for cybersecurity research matchmaking.



As of May 2, 2017

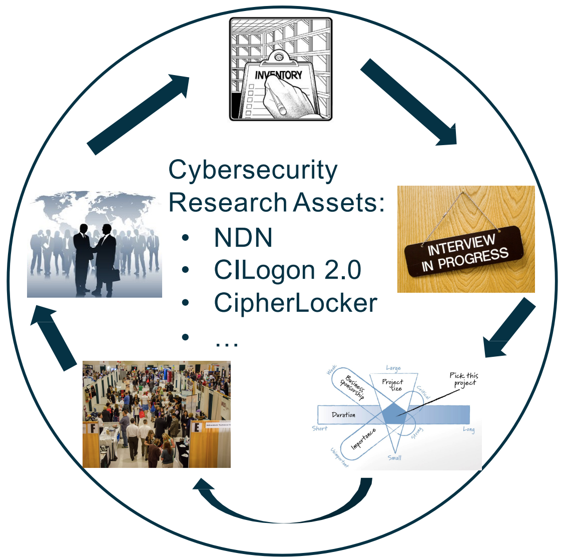
NSF EArly-concept Grant for Exploratory Research (EAGER): Cybersecurity Transition To Practice (TTP) Acceleration

Challenge

- Accelerate Transition To Practice (TTP) of NSF-funded later-stage cybersecurity research into R&E environments

Solution

- Identify & assess NSF cybersecurity research **inventory**
- **Interview** researchers & practitioners
- **Leverage Internet2 community** to enable "matchmaking"
- Deploy webinars, portal, in-person **events for researcher/IT matchmaking**
- Identify cybersecurity **needs/gaps**



Award Number: 1650445
Internet2
PI: Florence Hudson, SVP/Chief Innovation Officer

Scientific Impact

- Increase awareness of cybersecurity research & capabilities
- Accelerate cybersecurity TTP in the near- to mid-term to make cyberspace safer
- Identify cybersecurity needs to inform future NSF solicitations

Broader Impact

- Enable partnership for NSF TTP with other Federal agency programs to accelerate & streamline TTP pipeline
- Enable more diverse R&E pipeline partnering with Society of Women Engineers and others

Cybersecurity TTP Acceleration Project Plan
Start Date August 2016

Step	Project Activities	1Q	2Q	3Q	4Q	5Q	6Q	7Q	8Q
1	Project team in place								
2	Develop NSF Research Asset Inventory								
3	Interview NSF, researchers, practitioners, universities, industry, labs, DHS, other agencies								
4	Develop researcher/practitioner match-making showcase -online, events								
5	Develop TTP R&D showcase and technical workshops								
6	Deploy workshops				#1	#2	#3	#4	
7	Design, develop NSF TTP Portal								
8	Develop materials for NSF TTP Portal								
9	Deploy NSF TTP Portal								
10	Assess TTP program and develop recommendations								

SME Interview insights regarding TTP acceleration

Cybersecurity Researchers

- Key needs for TTP identified: Funding from NSF and others, early user feedback
- User feedback from pilot deployments critical to accelerate TTP
- Opportunity for acceleration of the TTP process at multiple steps
- Researchers like opportunity to leverage NSF TTP, DHS TTP, I-CORPS multiple agency support
- NSF TTP dollars sometimes perceived as small & cumbersome to capture, prefer working with VCs
- TTP not a priority for some researchers – looking to solve complex problems, not start a business

Practitioners for Pilot Deployments

- Practitioners need to know operational requirements for pilot use of TTP assets
- All size universities and regional networks interested in potential to test out / pilot cyber research early
- Smaller universities requested to participate in TTP as they have simpler approval processes
- Some universities unwilling to deploy unproven, non-production tested cybersecurity code

Agencies

- Interested in cross-agency collaboration opportunities for NSF and DHS to accelerate cyber TTP

TTP matchmaking webinars, workshops, showcases

1. On-going recruitment of cybersecurity TTP researchers and R&E practitioners for matchmaking
2. Ongoing TTP matchmaking webinars/workshops/showcases for researchers and R&E practitioners
   - Kickoff with 5 research assets highlighted for R&E community: Sept. 27, 2016, Internet2 TechEx, Miami
   - 2 cyber researchers presented to 8 universities, 5 regional NWs on Internet2 webinar – Nov. 18, 2016
   - 10 researchers for TTP workshop/showcase at Internet2 Global Summit April 23-26, 2017 in DC
   - Planning regional, Internet2 TechEx workshops
   - On-going researcher recruitment for webinar and workshop participation
3. Potential TTP coaching webinars and workshops for researcher matchmaking success
   - Knowing when you are ready to transition to an applied research environment for user input
   - Other potential topics: clarify value proposition, user handbook, operational requirements, user support
   - Identify coaching mentors and how best to provide it
4. Leverage virtual organization for matchmaking and cybersecurity awareness between cybersecurity researchers and campus and regional network IT organizations

Cybersecurity TTP Acceleration Webinars

- **Webinar November 18, 2016**
  - Control Your Cloud Deployments: Secure SQL, Storage, Encrypted File Sharing, Computation Environments, Radu Sion, Stony Brook University
  - Named Data Networking: An Internet Architecture for the Future, Christos Papadopoulos, Colorado State University
  - Slides & recording available: http://bit.ly/NSFEAGERTTP

- **Upcoming Webinars**
  - June 16: CILogon 2.0 - An Integrated Identity and Access Management Platform for Science, Jim Basney, University of Illinois at Urbana-Champaign
  - July 28: Cyber-Attack and Mitigation Demos for Wide-Area Control of Power Grids, Aranya Chakrabortty, North Carolina State University
  - August 11: Network Level Security Posture Assessment: Metrics, Data Analysis, and Risk Prediction, Mingyan Liu, University of Michigan

GS17 Cybersecurity Research Acceleration Workshop & Showcase

Identity & Access Management and Network Security

- CILogon 2.0 - An Integrated Identity and Access Management Platform for Science, Jim Basney, University of Illinois at Urbana-Champaign
- Passive and Active DNS Monitoring Tools for Detecting and Tracking the Evolution of Malicious Domain Names, Roberto Perdisci, University of Georgia
- Data-Driven Cyber Vulnerability Maintenance, Ted Allen, Ohio State University
- Mitigating Insider Attacks in Provenance Systems, Christian Collberg, University of Arizona

Smart Grid

- Cyber-Attack and Mitigation Demos for Wide-Area Control of Power Grids, Aranya Chakrabortty, North Carolina State University

Cloud Security & Storage

- A Campus Pilot For A Privacy-Enabled Cloud Storage, Search, and Collaboration Portal for Education, Radu Sion, Stony Brook University

Data Analytics & Security

- A Kit for Exploring Databases Under the Hood for Security, Forensics and Data, Alex Rasin, DePaul University
- A Distributed Visual Analytics Sandbox for High Volume Data Streams, Raju Gottumukkala, University of Louisiana-Lafayette

Internet of Things

- Cybersafety of Electric Vehicles and EVSE Equipment, Raju Gottumukkala, University of Louisiana-Lafayette
- Hardware based Authentication and Trusted Platform Module functions (HAT) for IoTs, Fareena Saqib, Florida Institute of Technology
- Toward Ethical Intelligent Autonomous Systems, A Case-Supported Principle-Based Behavior Paradigm, Michael Anderson, University of Hartford, Susan Anderson, University of Connecticut

EAGER Cybersecurity TTP Acceleration

Do you have a Cybersecurity Research Asset ready to present for potential pilot opportunities in research & education?

Join us to showcase your Cybersecurity Research on webinars, regional workshops, or at the Internet2 TechEx, October 15-18 in San Francisco http://bit.ly/2rvpuY3

Contact: enichols@Internet2.edu or cino@Internet2.edu

Questions & Answers…

Thank You

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Technology Transfer To Practice
SATC TTP

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5/18/2017

School of Computing
University of South Alabama

Acknowledgments

- Program Officer: Anita Nikolich
- National Science Foundation, ACI, “ Transitioning Funded Research Outcomes to Practice: Barriers, Opportunities, and Challenges ”, NSF 1503654, Aug 2014-Nov 2015
- National Science Foundation, ACI, Cyber Security Transition to Practice Workshop #2: Creating a TTP Roadmap”, NSF 1550544, Jul 2015-Jun 2016
- “A Principal Investigator’s Guide to Transferring Cybersecurity Technology to Practice (TTP)”, Rebecca Bace and Alec Yasinsac, Ph.D., University of South Alabama, www.southalabama.edu/colleges/soc/research/resources/guidetotransferringtechnologytopractice.pdf
- National Science Foundation, ACI, “EAGER: Creating a TTP Ecosystem Discovery and Support Resource for Cybersecurity Technology Transfer to Practice”, NSF 1636470, Aug 2016-Jul 2017, $199,902

http://soc.southalabama.edu/TTP/

TTP Defined

For our purposes, Technology Transfer to Practice (TTP) is:

The process of implementing an academic research result into operation in industry, government, or academia

TTP Further Defined

TTP involves the following three activities:

1. Producing a discernable outcome from federally funded, transformative research;
2. Establishing intellectual property protection for the outcome;
3. Delivering the outcome to productive use by society.

Which form of TTP?

- Start up
- Licensure
- Spin off
- Free distribution
- Informal TTP

Why engage TTP?

- Expand the impact of your research
- Codify the value of your research
- Expand/extend NSF funding
- Profit
- Form long-term industry connections
- Opportunities for students
- Etc.

What are the risks?

1. Career impact
2. Financial liability
   a. Company
   b. Personal
3. Reputation
4. Loss of family time
5. Stress

Key TTP Impediments

- Understanding the process
- Finding a client
- Team building
- The “business” stuff
- Building production code

The TTP Decision

1. What is the product or service?
2. What is the value proposition?
3. What is the price-performance advantage?
4. What is the market/who is the customer?
5. Is the market open/crowded/saturated?
6. What resources are required?
7. What is the potential ROI?
8. What are the risks?

NSF-SATC
TTP Designation

- Component of the regular SATC solicitation
- Transition <u>existing</u> research results to practice

SATC TTP Designation

- TTP Designation objective:
  - Support the development, implementation, and deployment of later-stage and applied security research <u>into an operational environment</u>.
- The operational environment can be:
  - Commercial, Government, Academia

TTP Designation Evaluation Criteria

- Description of the <u>problem being solved</u> or need being met
- Identification of a <u>target user group</u> or organization that will serve as an <u>early adopter</u> of the technology or specific milestones as to when an early adopter will be named;
- <u>Deployment plan</u> for implementing the capability or prototype system into an operational environment;
- <u>Novelty</u> of the intended system, software, or architecture;
- Composition of the <u>proposal team</u>;
- Appropriateness of the <u>budget</u> for the effort; and
- Extent of <u>university Technology Transfer Office</u> collaboration
- Post-grant <u>sustainability</u>;

SATC TTP Designation

- A TTP-designated proposal must:
  - Specifically describe how the successful research results will be further <u>developed and deployed</u> in organizations or industries, including in networks and end systems
  - Include a project plan that addresses <u>system development milestones and an evaluation plan</u> for the working system

SATC TTP Designation

- A Successful TTP-designated proposal should:
  - Have a well-defined user group
  - Include an industry partner
  - Have a solid, well-rounded project team
  - Show a good relationship with University TTO
  - Have a sound software development strategy
  - Present a convincing sustainability plan

NSF-SATC Submission Deadlines

- **MEDIUM** Projects
  - November 2, 2017 - **November 16, 2017**
- **SMALL** Projects
  - December 1, 2017 - **December 15, 2017**

NSF-SATC Funding & Duration

- **MEDIUM** Projects
  - 4 years
  - **\$501,000 - \$1,200,000**
- **SMALL** Projects
  - 3 years
  - **Up to \$500,000**

NSF SATC TTP Ecosystem

Providing Centralized TTP Resources*

1. “Mentoring” services
2. Best Practice repository
3. Software maintenance center
4. Matchmaking assistance
5. Contracting advice

*In development

TTP Ecosystem Services

- TTP Familiarization for Investigators
- Match-making
- Activities to identify prospective TTP-interested investigators;
- TTP training services for NSF PIs;
- Establishment of a TTP mentoring service for NSF/SATC PIs and prospective PIs;
- Development and implementation of a "Best TTP Practices" repository;

Mentorship Service

- Bull pen of experts with TTP experience
- Low/no cost to NSF Awardees
- Topics
  - Lean startup
  - Market analysis
  - IP
  - Staffing
  - Finance
  - Etc.

Best Practice Repository

- Identifying and attracting clients
- Negotiating IP issues
- Budgeting and accounting
- Marketing
- Staffing
- Software Development
- Case studies

Special Interest Groups

- Virtual Peer Group
  - Sign up today
- Listserv
- Tips & Tricks
- FAQ
- Success stories
- Upcoming events

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Questions?

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Thank You!

Questions?

Please take our survey.

About the CTSC Webinar Series

To view presentations, join the discuss mailing list, or submit requests to present, visit:

http://trustedci.org/webinars

The next webinar is June 19th at 11am Eastern

Topic: Provenance Assurance Using Currency Primitives

Speakers: Richard Brooks & Anthony Skjellum

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