Tennessee Cyber Security and Testing & Evaluation Range

CAST: http://www.memphis.edu/tnstc/index.php
CFIA: http://www.memphis.edu/cfia/
STEP: http://www.memphis.edu/step/

Cyber Security and T&E Overview
ITEA Cyber Workshop, March, 2016
Cyber Range Mission and Vision

Tennessee Cyber Security Testing & Evaluation Range

Mission of the TN Cyber Range
• To strengthen participating organizations through collaboration, innovation, information technology, knowledge sharing, and research applications

Vision of the TN Cyber Range
• TN Cyber Range is:
  • a thought leader with local and national impact, especially in developing innovative solutions.
  • a research leader collaborating with participating organizations through the development of applied research solutions.
  • the collaborative partner, being the center of statewide cooperation sharing technology, providing access to information and educational opportunities, and spurring economic development in TN and beyond.
Cyber Range Foundations

• University of Memphis has national strengths and leads TN state-wide universities:

  • Center of Information Assurance (CfIA), set up in 2004, is designated by NSA and DHS as a National Center for Academic Excellence in Information Assurance Education and Research

  • Systems Testing Excellence Program (STEP), established in 2006, is the largest and most integrative university research and training center in the field - helping the Department of Defense and the likes of FedEx, Lockheed Martin, and IBM with software testing education and research
Cyber Range Goals

**Research**

- *Research competitions* for faculty teams across campus provide seed funding for research projects/grants
- *University/industry expert* invitations to join research projects as co-investigators
- *Hiring faculty with cyber security T&E research interests*
- Incentive program to attract high-quality *graduate students and post-grads*
- *Projects for industry* seeking best practices
- *Publish ground-breaking research* in top-tier conferences and journals
Cyber Range Goals

Training Certification Programs
• Cyber security T&E certification
  • to become industry standard based on scholarly science and best practices

Educational Curriculum
• Curricular execution in undergraduate and graduate programs
  • form a pipeline of well-trained future cyber security T&E professionals

Workshop and Colloquia
• Forum for leading thinkers to present the latest research
• National-level workshop on cyber security T&E
• Partnerships with industry organizations and state and federal agencies
• Sponsor top cyber security T&E leaders to visit Memphis to engage with local faculty and practitioners on state-of-the-art ideas
CAST Partnerships

Cluster to Advance Cyber Security & Testing

Outreach
Education
Research
Cyber Forensics, Cyber Laws and Regulations
Criminal Justice Department

Research
TN Cyber-Security & Testing Cluster

Education

Services

Training

Support School

Online programs, Awareness, Community colleges, K-12, Boot camps

Research
Cyber Forensics, Cyber Laws and Regulations

Outreach

NRI

APPLAUSE

AWARDS

WINNING APPS GET IT

LOCKHEED MARTIN

The University of
Memphis

DISA

A Combat Support Agency

FedEx

Mphasis

Consider IT Done

SYNTEL

COOK SYSTEMS INTERNATIONAL

CISCO

AutoZone

Thomas & Betts
CAST Collaborators

Outreach
- Health Related Department
- mHealth info Privacy, HIPPA Security

Education
- Criminal Justice Department
- Cyber Forensics, Cyber Laws and Regulations

Research
- Miscellaneous areas
  - Online Social behavior, Linguistic, Cognitive, Intelligent Systems, Mathematics
  - Smart Grid, Control System, Critical Infrastructure, BME

Certification
- Business School
  - STEP, Risk Management, E-fraud, Supply Chain, Auditing

Training
- Education Department
  - Online programs, Awareness, Community colleges, K-12, Boot camps

Services
Current CAST Researcher Interests

• Cyber Security Test Technologies
  – Vulnerability software modules for testing systems
  – Intrusion detection sensors on systems and networks

• CPTO – Cyber Program Test Office
  – Coordinating collaborative cyber security testing in projects

• Cyber-physical systems and dynamic software updating (mobile, app, IoT, cloud, wearables)
  – Unanticipated environmental condition and interacting components

• Model-based testing
  – Data analytics for predictive test resourcing
  – Run-time analysis and mutation analysis
  – Domain specific languages (performance test)
Research model:

**NSF/NIH/other Grants**
- focused on specific industry-wide challenges (non-commercializable)

**Contract Research**
- using science to examine specific company / gov’t challenges

**R&D**
- focused on business sustainability and return on investment (commercializable)

Filling in the Gap
Filling in the Gap

Preparing the T&E Workforce for the Speed of Need

Tony Stout
Defense Information Systems Agency (DISA)

Robin Poston, Ph.D. and Jasbir Dhaliwal, Ph.D.
Systems Testing Excellence Program (STEP)

Given the goal of testing at the speed of need—which requires agility, flexibility, and accelerated testing by the test-and-evaluation (T&E) workforce—a critical enabling factor is the advancement of capabilities of key T&E organizations. The goal is to shift from a strong focus on managing people and projects to one on strategically measuring and maintaining a bundle of organizational technical skills and competencies that ensure future success. It is a modern strategic imperative that an organization fully understand its pre-existing skills-and-competencies profile and develop consensus around a targeted skills-and-competencies profile for future success. A deep appreciation of the gaps between these two profiles must then systematically drive all training, hiring, work allocation, contracting, and related human-resource management decisions over an extended period of time.

As the Department of Defense moves away from system-centric development and relies more heavily on software-driven services offered at the enterprise level, both the speed and accuracy at which these services are delivered become key value factors for the users. Recognizing this evolution in need is paramount to developing the workforce; such a recognition led the Defense Information Systems Agency (DISA) and the Joint Interoperability Test Command (JITC) to conduct an internal review of skills and competencies as they relate to T&E. This effort would lay the foundation for developing the T&E workforce for the speed of need.

meetings, and administer employee questionnaires to fully understand the mission, scope, and context of the work being performed by the T&E workforce.

- **Phase 2: Survey the workforce.** Develop, execute, and analyze the results of a customized skills-and-competencies (S&C) survey.
- **Phase 3: Postsurvey analysis.** Analyze survey data and provide a comparison of current skills inventory against the organizationally submitted TO-BE S&C profile, with recommend courses of action.

Phase 1 (preliminary research) included research into the roles, responsibilities, skills, and competencies of the DISA/JITC T&E workforce. This effort included the iterative development of skills-and-competencies analysis categories for use in a customized online questionnaire, through the use of data collected using a paper-based questionnaire from identified workforce members. The primary goal was to develop the categories for an online survey to provide an AS-IS competency portfolio to serve as the basis for a customized training program for skills improvement based on the development of a TO-BE skills-and-competency portfolio for future success. While the team projected a TO-BE profile at the data-analysis stage, this must ultimately be defined at both organizational and suborganizational levels and must be clearly aligned with the roles and responsibilities of the unit—whether at the division, portfolio, branch, or team level.

During Phase 2 (survey), the STEP team used data
Building on the Memphis Testing Research and Operations Ecosystem

Our goal is to create the same ecosystem in Memphis for Cyber Security T&E
Visit us in Memphis!
## 3rd Cyber Security Workshop
### Partnering with Industry and Academia Panel

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<tr>
<th>Time</th>
<th>Speaker(s)</th>
<th>Topic</th>
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<td>Robin Poston, University of Memphis, System Testing Excellence Program (STEP)</td>
<td>Partnering with Industry and Academia</td>
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<tr>
<td>1:15</td>
<td>Charles Nelson, Strategic Initiatives, US Cyber Command</td>
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<td>1:45</td>
<td>David Desjardins and Mark Bradbury, Raytheon</td>
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<td>Lee Rossey, SimSpace</td>
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<td>3:00</td>
<td>Dr Dipankar Dasgupta, University of Memphis, Center for Information Assurance</td>
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<td>Dr George Hsieh, Norfolk State University</td>
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