National Science Foundation
Funding Opportunities for Cybersecurity Education and Workforce Development

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“Throughout our history, scientists and scientific knowledge have contributed to our progress as a Nation. If you want to keep up that progress, we need to stimulate scientific discovery and research, and train more young men and women for our laboratories and research centers. To carry out these objectives, I have just signed the National Science Foundation Act of 1950. This act is of tremendous importance, because it will add to our knowledge in every branch of science. I am confident that it will help us to develop the best scientific brains in the Nation. It will enable the United States to maintain its leadership in scientific matters, and to exert a more vital force for peace.”

— President Harry S. Truman
The legislation established NSF ...

“To promote the progress of science; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes.”

—National Science Foundation Act of 1950
What does NSF do?

• Support *basic research* and *education* in *all* fields of science and engineering, except medical, through grants and other funding mechanisms

• No research in-house — NSF outsources the work
NSF Funding for Academic Basic Research in Selected Fields As a Percentage of Total Federal Funding

- Computer Science: 82%
- Biology*: 65%
- Mathematics: 64%
- Social Sciences: 57%
- Environmental Sciences: 57%
- Physical Sciences: 45%
- Engineering: 35%
- All Science & Engineering Fields: 21%

* Biology includes Biological Sciences & Environmental Biology; excludes NIH.

Source: NSF
NSF is also the source of 34% of all Federal support for STEM education.
Examples of NSF Education Programs/Foci

• Research Experiences for Undergraduates (REU), Research Experiences for Teachers (RET), International Research Experiences for Students (IRES)
• Research on effective pedagogical practices/methods and how students learn
• Research on attracting students to, and retaining them in, STEM education and careers
• Getting faculty to adopt effective pedagogical practices/methods
Examples of NSF Education Programs/Foci (cont.)

- Developing the STEM workforce at all levels (from technicians to PhD researchers)
- Preparing more, and better, K-12 STEM teachers
- Broadening participation in STEM (women, minorities, persons with disabilities)
- Informal science education (e.g., museums, science centers, IMAX films, citizen science)
- Scholarships (e.g., Scholarships in STEM [S-STEM], CyberCorps), traineeships, Graduate Research Fellowships, postdoctoral fellowships
- Presidential awards for K-12 STEM teaching (PAEMST) and for mentoring (PAESMEM)
NSF by the Numbers (FY2013)

$6.9 billion Appropriation
1,922 Institutions receiving NSF funding
49,000 Proposals evaluated through NSF’s competitive merit review process
10,800 Proposals funded (funding rate: 22%)
233,000 Proposal reviews conducted
299,000 People directly supported by NSF (faculty, postdoctoral fellows, trainees, teachers, students)
47,800 Students supported by NSF Graduate Research Fellowships since 1952
2,052 NSF workforce (1,418 Federal employees, 185 IPAs/detailees, 449 contractors)
Funding Opportunities for Cybersecurity Education

- CyberCorps: Scholarship for Service (SFS)
- Secure and Trustworthy Cyberspace (SaTC)
- Advanced Technological Education (ATE)
CyberCorps: Scholarship for Service (SFS)

The SFS program seeks to...

• increase the **number of qualified students** entering the fields of information assurance and computer security;
• increase the **capacity of the U.S. higher education enterprise** to produce professionals in these fields.

Two tracks:

• **Scholarship Track** provides funding to colleges and universities to award scholarships to students. Grant size: $1M–$5M.
• **Capacity Track** provides funds to support curriculum development, faculty development, outreach, partnership development, and related activities. Grant size: $300k–$900k.
SFS Scholarships

Scholarship Component
- Funding: Tuition, fees, and stipends ($20k/$25k/$30k per year)
- Length: 2-3 year scholarship for final years of undergraduate or graduate (master’s or doctoral) education
- Obligation: Summer internship, post-graduation service requirement (work in Federal agency equal to scholarship length)

Student Eligibility
- U.S. Citizen
- Enrolled in IA program, within 2-3 years of graduation
- Eligible for Federal employment (must be able to acquire security clearance)
- Awardee institutions set additional selection criteria

Institutional Eligibility
- National CAE/IAE designation or equivalent (DC3 Forensics, NSA Cyber Ops, or alternative evidence)
- Offer full-time program of study in IA field(s)
SFS Scholars

• First cohort of 9 students entered the Federal IA workforce in 2002. In 2013, 188 students graduated.

• 2,071 SFS scholarship recipients to date; 1,554 have graduated.

• SFS graduates have served in more than 140 Federal agencies, as well as in state, local, and tribal governments.
## Schools and Employers of SFS Graduates

### Top Enrolling Schools 2007-12

<table>
<thead>
<tr>
<th>University of Tulsa</th>
<th>126</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carnegie Mellon</td>
<td>87</td>
</tr>
<tr>
<td>Naval Postgraduate School</td>
<td>58</td>
</tr>
<tr>
<td>U of North Carolina</td>
<td>57</td>
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<tr>
<td>Mississippi State U</td>
<td>56</td>
</tr>
<tr>
<td>Idaho State University</td>
<td>47</td>
</tr>
<tr>
<td>Syracuse University</td>
<td>45</td>
</tr>
<tr>
<td>Polytechnic University NY</td>
<td>36</td>
</tr>
<tr>
<td>NC A&amp;T State U</td>
<td>36</td>
</tr>
<tr>
<td>New Mexico Tech</td>
<td>34</td>
</tr>
<tr>
<td>Stony Brook University</td>
<td>34</td>
</tr>
<tr>
<td>Air Force Institute of Tech</td>
<td>34</td>
</tr>
<tr>
<td>Iowa State University</td>
<td>31</td>
</tr>
<tr>
<td>George Washington U</td>
<td>30</td>
</tr>
<tr>
<td>Georgia Tech</td>
<td>27</td>
</tr>
<tr>
<td>Johns Hopkins University</td>
<td>25</td>
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</tbody>
</table>

### Top Hiring Agencies 2007-12

<table>
<thead>
<tr>
<th>National Security Agency</th>
<th>142</th>
</tr>
</thead>
<tbody>
<tr>
<td>US Navy</td>
<td>64</td>
</tr>
<tr>
<td>Department of Defense</td>
<td>39</td>
</tr>
<tr>
<td>MITRE Corporation</td>
<td>39</td>
</tr>
<tr>
<td>Sandia Laboratory</td>
<td>31</td>
</tr>
<tr>
<td>DHS</td>
<td>29</td>
</tr>
<tr>
<td>US Army</td>
<td>28</td>
</tr>
<tr>
<td>Central Intelligence Agency</td>
<td>26</td>
</tr>
<tr>
<td>Federal Reserve System</td>
<td>26</td>
</tr>
<tr>
<td>Department of Treasury</td>
<td>26</td>
</tr>
<tr>
<td>Software Engineering Inst</td>
<td>21</td>
</tr>
<tr>
<td>Department of Justice</td>
<td>19</td>
</tr>
<tr>
<td>State/Local/Tribal Gov</td>
<td>19</td>
</tr>
<tr>
<td>US Air Force</td>
<td>16</td>
</tr>
<tr>
<td>Other</td>
<td>132</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>657</strong></td>
</tr>
</tbody>
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Secure and Trustworthy Cyberspace (SaTC)

Cybersecurity Education Proposals

• Proposals should leverage successful results from previous and current basic research in cybersecurity and research on student learning ... to address the challenge of expanding existing educational opportunities and resources in cybersecurity.

• Grant size: $300k
# SaTC Education — Recent Awards

<table>
<thead>
<tr>
<th>PI</th>
<th>Institution(s)</th>
<th>Project Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hu Morris</td>
<td>U of Alabama, Mississippi State</td>
<td>A Multimedia-based Virtual Classroom for Cyber-Physical Systems Security Education</td>
</tr>
<tr>
<td>Murphy</td>
<td>Marymount U</td>
<td>Cybersecurity Competitions in the Healthcare Environment</td>
</tr>
<tr>
<td>Du Yang, Yuan</td>
<td>Syracuse U, U of Tennessee, NC A&amp;T State</td>
<td>Bolstering Security Education through Transiting Research on Browser Security</td>
</tr>
<tr>
<td>Williams</td>
<td>NC State U</td>
<td>Software Security Education</td>
</tr>
<tr>
<td>Li</td>
<td>U of Georgia</td>
<td>Stepwise and Reusable Problem-solving Challenges</td>
</tr>
<tr>
<td>Chandy</td>
<td>U of Connecticut</td>
<td>A Virtual Lab for a Hardware Security Curriculum</td>
</tr>
<tr>
<td>Goel</td>
<td>SUNY at Albany</td>
<td>Flipping the Security Classroom</td>
</tr>
<tr>
<td>Hicks</td>
<td>U of Maryland</td>
<td>Build it, Break it, Fix it - A new security contest</td>
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<tr>
<td>Manson</td>
<td>Cal Poly Pomona</td>
<td>National Cybersecurity Sports Federation</td>
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<tr>
<td>Qaissanee</td>
<td>Brookdale CC</td>
<td>New Jersey CyberCenter</td>
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<tr>
<td>Dark</td>
<td>Purdue U</td>
<td>Information Security Research and Education (INSuRE)</td>
</tr>
<tr>
<td>Bashir Memon</td>
<td>U of Illinois</td>
<td>Enhancing the Cyber Security Workforce - The Human Angle</td>
</tr>
</tbody>
</table>
Advanced Technological Education (ATE)

- Education (degree programs, not “training”) of technicians in high-tech fields that drive the economy (IT/cybersecurity, biotech, chemical tech, engineering tech, manufacturing, etc.)
- Goals: More technicians, and high-quality technician workforce (quantity, quality)
- Community colleges have leadership role
- Partnerships involving CCs, secondary schools, 4-year colleges and universities, business/industry, and government
Scale of ATE Grants

- “Centers” ~ $1M/year
- “Projects” ~ $100k–$900k/year

Activities

- Development of materials, labs, courses, curricula, programs (degrees and certificates)
- Professional development for faculty
- Transfer agreements with 4-year colleges/universities
- Internships for students
- Mentoring of other CCs to develop new programs
- K-12 curricula and outreach (students, teachers, counselors, parents) to recruit into technician careers
- Student competitions (Cyber Defense, Digital Forensics Challenge)
ATE Centers for Cybersecurity Education

• National CyberWatch Center
  – Prince George’s CC (MD) and partners
  – www.cyberwatchcenter.org

• Ctr. for Systems Security & Info. Assurance (CSSIA)
  – Moraine Valley CC (IL) and partners
  – www.cssia.org

• Cyber Security Education Consortium (CSEC)
  – University of Tulsa, Oklahoma CareerTech, and partners
  – www.cseconline.org

• CyberWatch West
  – Whatcom CC (WA) and partners
  – cyberwatchwest.org
ATE Large Project for Cyberforensics Education

• Advanced Cyberforensics Education (ACE) Consortium
  – Daytona State College (FL) and partners
  – www.cyberace.org
Additional Information

CyberCorps: Scholarship for Service (SFS)
http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504991
https://www.sfs.opm.gov/

Secure and Trustworthy Cyberspace (SaTC)
http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=504709

Advanced Technological Education (ATE)
http://www.nsf.gov/ate
http://www.atecenters.org
http://www.atecentral.net