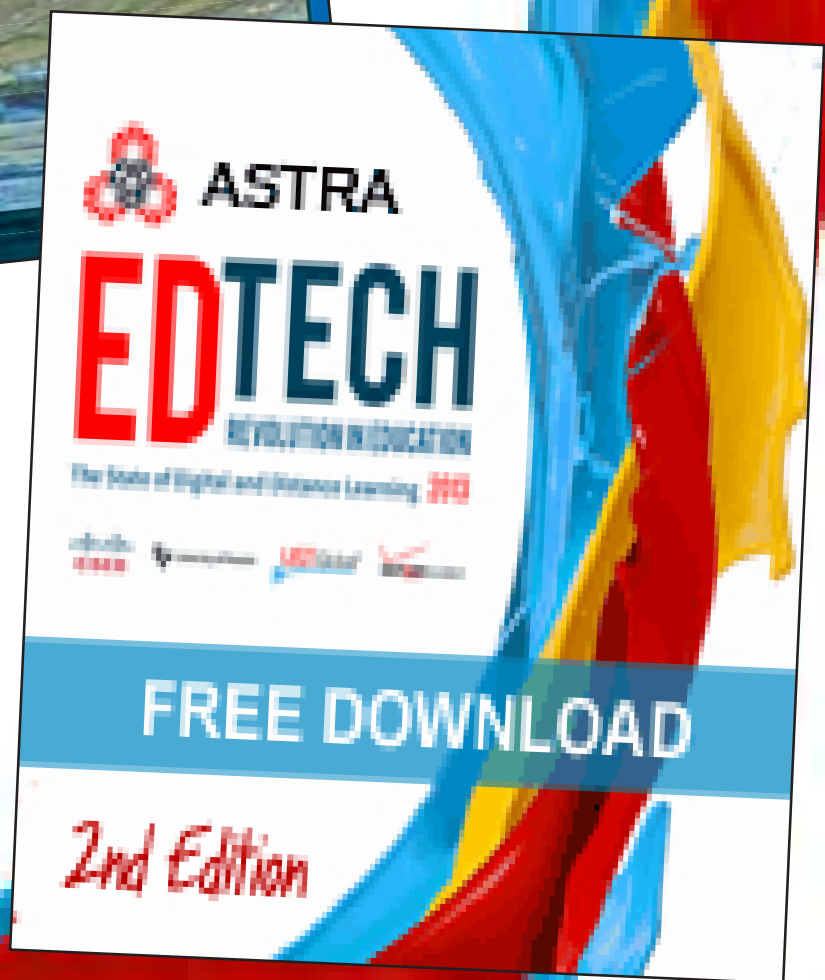


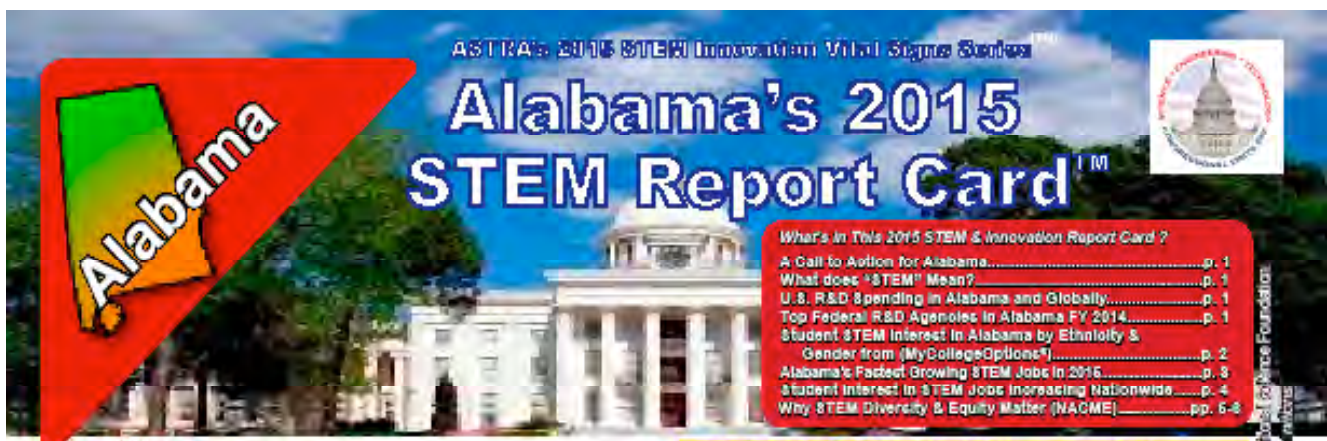
## Recent ASTRA Publications & Research



Our recent publication, **EdTech Revolution in Education**, was launched at the U.S. News & World Report STEM Education Summit.

It celebrates the unlimited possibilities that technology provides as a tool for transformation. The book contains contributions from 98 contributors. It champions partnership development to create synergies among all education stakeholders so that we can achieve together what no one institution can do alone.





- \*STEM =**
- Science**  
Biology, Chemistry, Marine Biology, Physics, Science
  - Technology**  
Computer / Information Systems, Game Design, Developer, Web / Software Developer
  - Engineering**  
Chemical, Civil, Computer, Electrical / Electronics, Photonics, General & Mechanical Engineering
  - Mathematics & Statistics**  
Accounting, Auditors, Financial Specialists

**There's bipartisan consensus:** America's free market economy relies heavily upon federally-supported scientific & engineering research (R&D). R&D provides the basis for our economic and technological might.

Most agree that the U.S. needs to live within its means, cut the federal deficit and do it the smart way — through **technology-based economic growth.**

A National Science Foundation (NSF) study found that 73% of the scientific papers cited in commercial patents were funded by taxpayers through the federal government, especially university research operations.<sup>1</sup>

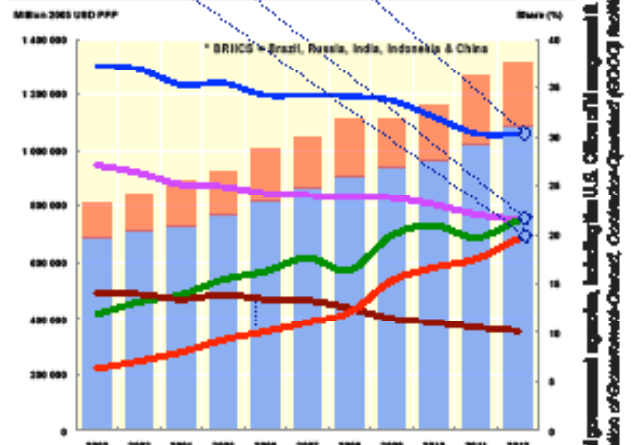
Alabama received **\$3 billion in federal R&D contracts in FY 2014, with approximately 3,160 transactions taking place.**<sup>2</sup> Alabama universities and colleges received \$808.2 million in federal R&D spending, **including grants**, in FY 2012<sup>3</sup>, the latest year available from NSF.

**Key Reports and On-Line Resources**

- The Science-Engineering-Technology Working Group (SETWG) has sponsored the annual *STEM on the Hill™* Congressional Visits Day Program since 1995. See [www.setwg.org](http://www.setwg.org)
- *Science & Engineering Indicators 2014*, published by the National Science Board, provides a broad base of quantitative information on the U.S. and international science and engineering enterprise. It is created biennially by the National Science Foundation's Division of Science Resources Statistics (SRS) See [www.nsf.gov/statistics/seind14/](http://www.nsf.gov/statistics/seind14/)
- ASTRA's Web Sites include [www.usinnovation.org](http://www.usinnovation.org). See also [store.usinnovation.org](http://store.usinnovation.org) for free downloads of all ASTRA State STEM Report Cards 2015, the ASTRA 2015 National & State STEM Census, the ASTRA EdTech Revolution in Education book and all of our latest publications, videos and reports from the field.
- The American Academy of Arts & Sciences published *Restoring the Foundation: the Vital Role of Research in Preserving the American Dream* in September 2014. See [www.aasnet.org/content/Research/research-project.aspx?i=1276](http://www.aasnet.org/content/Research/research-project.aspx?i=1276)

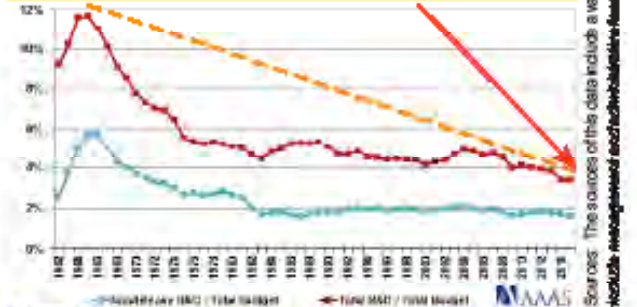


**CAUSE FOR ALARM: U.S. R&D Investment Declining — China / BRICS\* Rising Rapidly & Overtaking U.S.<sup>4</sup>**



4. Source: OECD Main Science and Technology Indicators Database, June 2014, [www.oecd.org/etis/](http://www.oecd.org/etis/); Eurostat and UN/BCOD Institute of Statistics, June 2014.

**Declining Support: Federal R&D Outlays as Percentage of Federal Budget 1962-2015\***



5. Source: Budget of the U.S. Govt. 2014 Annual Table, FY 2014 to the request, © 2014 AAAS

**Top 5 Contracting Agencies\* for Alabama's Federal R&D Investments During FY 2014 † (Industry Billions of Dollars)**

1. Department of Defense	\$2,828,000,000
2. NASA	\$178,000,000
3. Health & Human Services	\$110,000,000
4. Department of Homeland Security	\$24,000,000
5. Department of Transportation	\$7,000,000



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# Recent ASTRA Publications & Research



ASTRA's STEM Innovation State Report Series™ 2012

## ASTRA STEM Innovation State Report Series™

**FREE DOWNLOAD**



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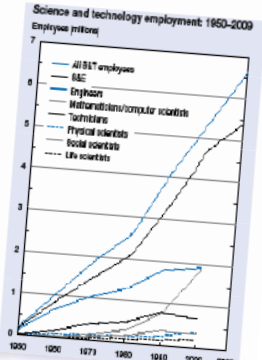
### STEM Jobs Overview

## STEM JOBS by Sector: Where will the STEM Jobs be in 2018?

The overall U.S. Science & Technology (S&T) Workforce exceeded **7.4 million workers** in 2012 and it will continue to grow significantly through 2018, to an estimated **8,654,000** STEM workers.

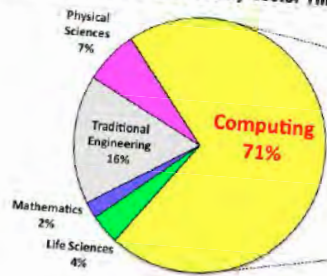
Science & Engineering Occupations are projected to **grow at more than double the rate (20.6%)** of the overall U.S. labor force (10.1%) through 2018. These projections do not include occupations for which STEM degree holders use their STEM skills but are not considered by the Bureau of Labor Statistics to be "Strictly defined" STEM occupations. The total also includes individuals with STEM degrees as well as **more than 1 million** individuals with technical STEM degrees (see *Top 97 STEM-Related jobs* section below).

By 2018, the bulk of STEM jobs will be in **Computing (71%)** followed by **Traditional Engineering (16%)**, **Physical Sciences (7%)**, **Life Sciences (4%)** and **Mathematics (2%)**. The breakdown of Computing Jobs is shown in the second schematic below:

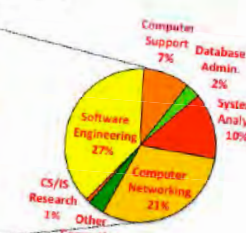


Science and technology employment: 1960-2009  
Employee (million)

### Percentage of New STEM Jobs by Sector Through 2018



Sector	Percentage
Computing	71%
Traditional Engineering	16%
Physical Sciences	7%
Life Sciences	4%
Mathematics	2%



Sub-Sector	Percentage
Software Engineering	27%
Computer Networking	23%
Other Computing	8%
CS/IS Research	1%
Computer Support	7%
Database Admin.	2%
Systems Analysis	10%

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### STEM Focus: Computing

## New Demands for STEM Skills: Cybersecurity

Cybersecurity Jobs are in great demand, and most of them are IT-related. The objective of computer security includes protection of information and property from theft, corruption, or natural disaster, while allowing the information and property to remain accessible and productive to its intended users.

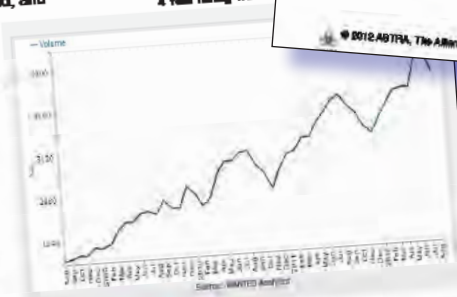
Frost & Sullivan estimates the number of information security professionals worldwide in 2010 to have been approximately 2.28 million. This figure is expected to increase to almost 4.24 million by 2015, displaying a Compound Annual Growth Rate (CAGR) of 13.2 percent from 2010 to 2015.

See CyberInformation Security - The 2011 (ISC) Global Information Security Workforce Study - Frost & Sullivan [https://www.isc2.org/uploaded/Electronic\\_Resources/ES\\_WP\\_10262011\\_Study\\_120811\\_MLW\\_Web.pdf](https://www.isc2.org/uploaded/Electronic_Resources/ES_WP_10262011_Study_120811_MLW_Web.pdf)


Thousands of Cybersecurity jobs are open to STEM graduates. A variety of STEM skills are needed for success in this burgeoning field. The schematics to the right capture the 4-year growth trend in Cybersecurity jobs as documented by WANTED Analytics as well as a map of metropolitan areas ranking them by difficulty in filling the jobs. Fierce competition to fill Cybersecurity jobs is indicated by the darker shades.

Not surprisingly, the National Capital Region has the most intense competition to fill such jobs, many of them associated with government cyberdefense efforts.

However, each location and region of the US will experience a varying degree of difficulty when recruiting. Competition in Baltimore, Maryland and Washington, DC are currently experiencing some of the most challenging overall recruiting conditions. Fierce competition has emerged as being in these areas is growing more quickly than the local talent supply can support. Job ads in this area remain online for an average of 7 weeks. In comparison, the *Wanted Scale* also shows that Tucson, Arizona and Silver-Spruit, Texas are likely to see the least difficulty in recruiting for these positions. A large talent supply compared to the being demanded by employers in these 2 areas means that recruiters are likely to fill open cyber security positions faster than average. The average duration of a job ad in these locations is 5 weeks, about one week shorter than the national average.



Hiring Demand for U.S. Cybersecurity Jobs  
4 Year Hiring Trend 2008-2015



Wanted Scale: 1 (lightest) to 7 (darkest)

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