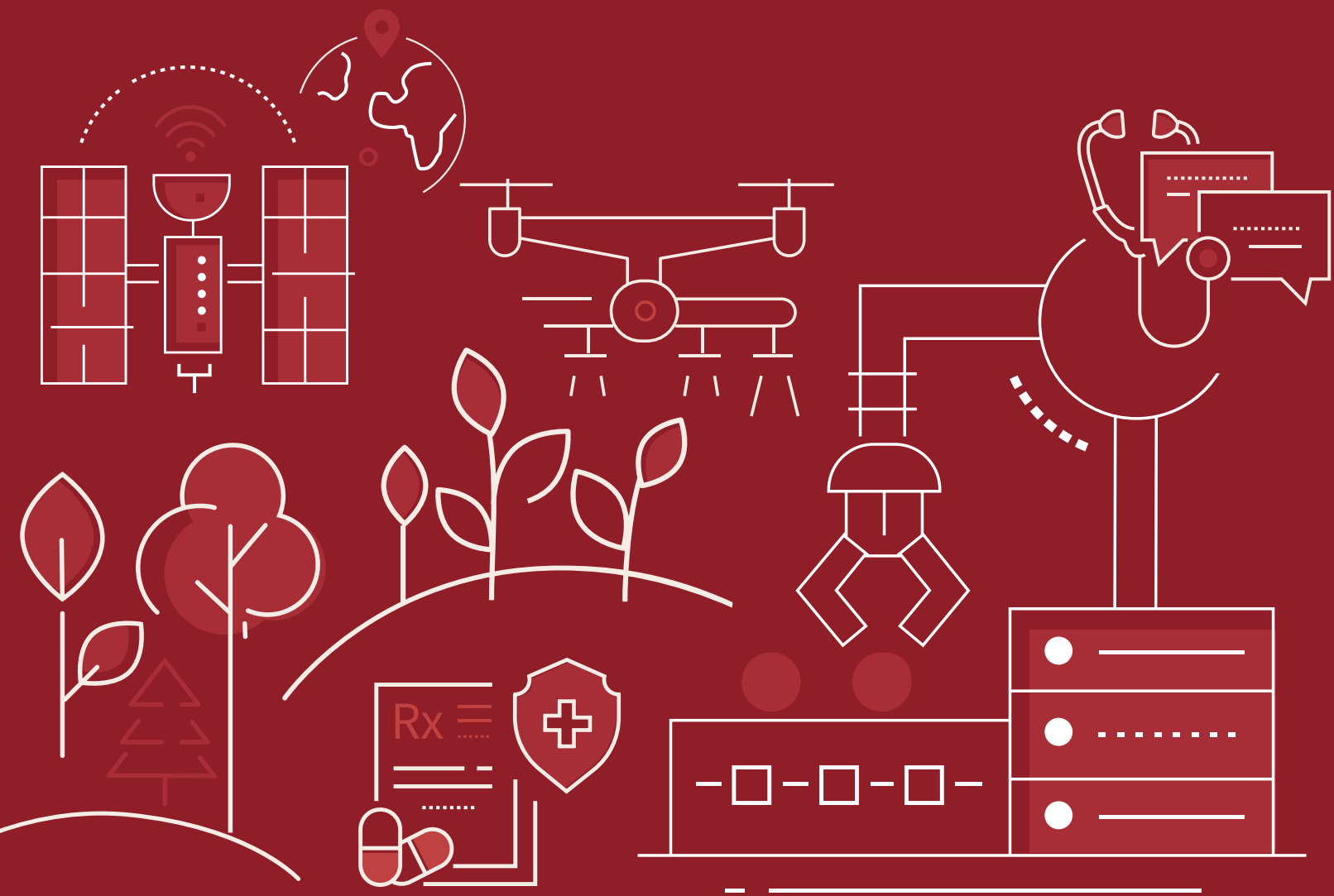


Alabama 2030

Science and Technology Plan





The development of the Alabama Science and Technology Plan: Vision 2030 was led by Jennifer Ozawa at RTI International in collaboration with Christopher Lawson, Alabama EPSCoR Executive Director; Tiffany Vickers Davis, Alabama EPSCoR Program Coordinator; and the Alabama EPSCoR Steering Committee. Shannon Wells and Carly Dotson of RTI provided research, data collection, and analysis. Lisa Gardner created the report design, and Christina Rodriguez was the editor. The plan was adopted by the Alabama EPSCoR Steering Committee on June 29, 2026.

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June 30, 2026

EPSCoR (Established Program to Stimulate Competitive Research) is a federal initiative through which the National Science Foundation (NSF), National Institutes of Health (NIH), and other agencies build research capacity in states that receive a disproportionately small share of federal R&D funding. Alabama EPSCoR (ALEPSCoR, www.alepscor.org) advances technology-based economic development through collaborative scientific and engineering research among the state's eight Ph.D. granting institutions, the Economic Development Partnership of Alabama, and the Alabama Commission on Higher Education. ALEPSCoR is governed by the ALEPSCoR Steering Committee (AESC), with representatives from each partner organization.

From 2015 to 2025, ALEPSCoR received 303 federal EPSCoR grants totaling more than \$195M, with research expenditures of \$28M and \$29M in FY2024 and FY2025, respectively. This funding has driven scientific discoveries, new capabilities, and improvements in high-tech infrastructure that support sustainable job growth in Alabama. The state amplifies this impact through the Graduate Research Scholars Program (GRSP), which funds graduate students working on EPSCoR research to expand the pool of highly trained talent available to Alabama industries; more than 410 students have received state GRSP support since 2006.

ALEPSCoR and AESC, with support from RTI International, have developed the "*Alabama 2030 Science and Technology Plan*" — a roadmap for S&T-based strategies and investments in Alabama over the next five to seven years. The Plan reflects input from stakeholders across industry, state government, economic development organizations, and research universities.

The Plan positions Alabama as a premier S&T destination in the Southeast, organized around six high-priority research areas: (1) AI and Quantum Computing, (2) Biotechnology and Biomedical Sciences, (3) Materials and Manufacturing Science, (4) Robotics, Autonomy, and Automation, (5) Space and Unmanned Vehicles, and (6) Agriculture, Forestry, Fisheries, Water Systems, and Coastal Resilience. These areas align with Alabama's research strengths, industry needs, and federal R&D priorities. They will support four target industries — Transportation and Logistics; Defense and Aerospace; Bioscience and Biomanufacturing; and Agriculture, Forestry, and Bio-Based Products — through three growth pathways: STEM workforce development, R&D, and technology commercialization.

On behalf of ALEPSCoR, AESC, and the many contributors to this effort, we are pleased to present the Alabama 2030 Science and Technology Plan to policymakers, industry leaders, economic developers, university administrators, researchers, and all those working toward the shared goal of elevating the prosperity of Alabama's citizens and economy.

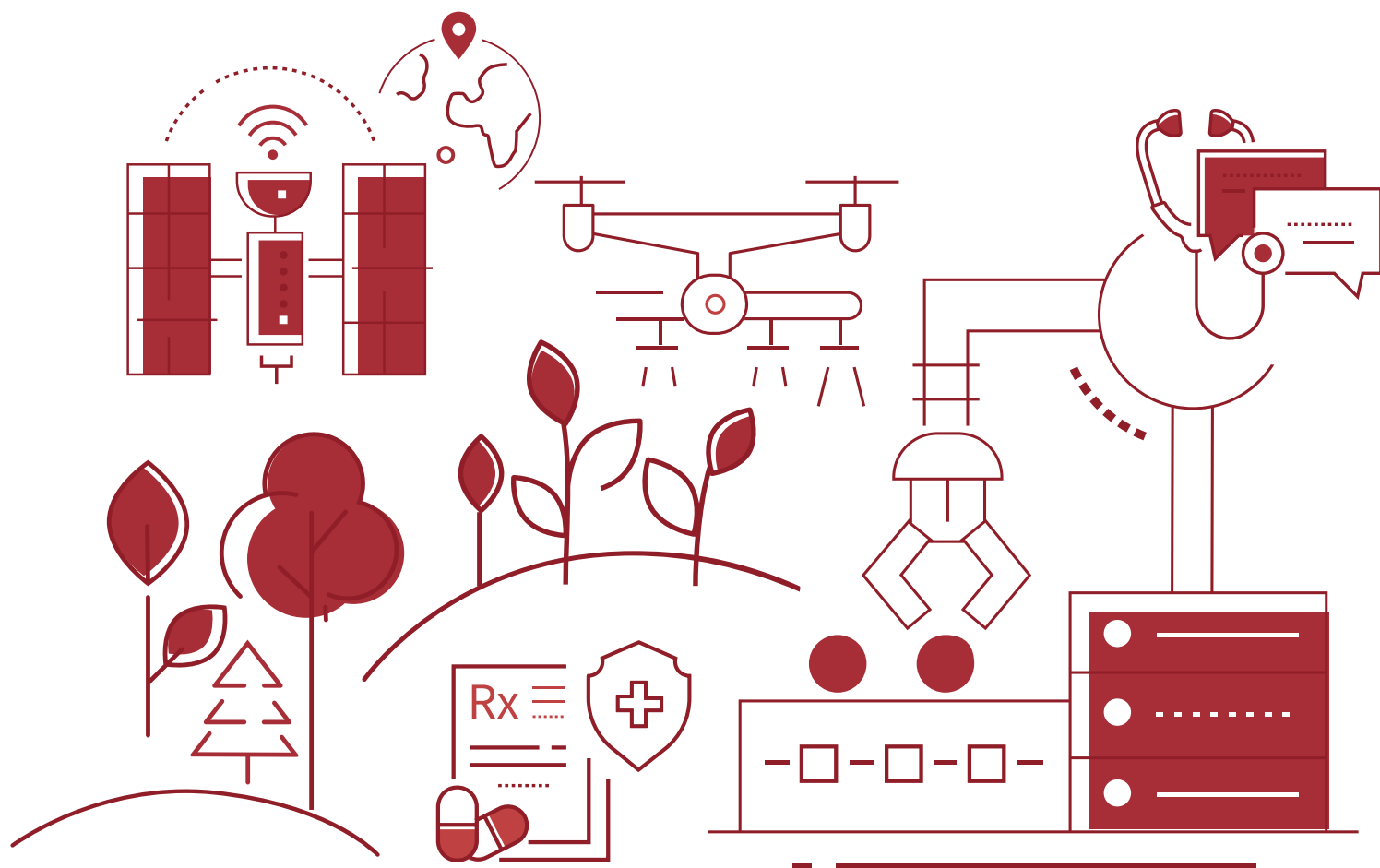
Respectfully,

Majed Dweik, Ph.D.
Chair of AESC
Vice President for Research & Economic Development
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The state of Alabama stands at a critical juncture. To secure its position as a premier Southeastern hub for high-tech industry and innovation, it must aggressively pursue the expansion of research, its science, technology, engineering, and math (STEM) workforce, and technology commercialization. Guided by the 2030 Science and Technology Plan, Alabama can advance high-priority research areas that contribute to Alabama's economic growth, but achieving this vision requires coordinated action to address workforce and competitiveness gaps.

The Business Case

Alabama's research and development (R&D)-intensive industries are a vital engine for growth, employing over 132,000 residents of the state and growing at 2.3% annually over the past 5 years. These sectors are a primary driver of productivity and export capacity. Although the state has successfully attracted global leaders like Eli Lilly and ArcelorMittal, long-term prosperity depends on Alabama's ability to sustain this momentum through local research and innovation.

Critical Challenges

Despite its successes, two primary bottlenecks threaten to limit Alabama's future:

1. **STEM talent shortage:** Although one-third of Alabama's jobs are STEM-based, the state faces critical labor shortages across industries. A concerning 10% decline in Alabama undergraduate engineering degree recipients since 2019, coupled with 18% of Alabama youth (16-24 years of age) remaining outside the workforce or education system, creates a talent pipeline deficit that could stifle long-term industry expansion.
2. **Commercialization lag:** Alabama ranks 26th among U.S. states for total R&D spending (\$9.1 billion), but currently trails in intellectual property production, ranking 44th in patents and 47th in trademarks. Transforming discovery into commercial success is essential to realizing the full economic value of the research enterprise.

Strategic Opportunity

The foundation for success is already in place. Alabama's innovation profile is strengthening:

- **Research impact:** Alabama's eight public PhD-granting institutions are generating a pipeline of talent and discovery, ranking Alabama first among Established Program to Stimulate Competitive Research (EPSCoR) states in academic R&D activity. In 2024, the eight EPSCoR institutions awarded 100% of Alabama's total S&E doctorates.
- **Federal success:** Alabama ranks eighth nationally in federal Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) awards relative to the size of its economy, securing \$94.7 million in 2025.
- **Venture capital (VC) investment:** VC investment in Alabama early-stage companies has more than tripled, jumping from \$521.7 million (2016–2020) to \$1.8 billion (2021–2025).



The Strategy

To transition from a growing player to a national leader, Alabama must prioritize:

- **Bridging the talent gap:** Align higher education degree production with industry demand and implement aggressive strategies to re-engage disconnected youth.
- **Strengthening commercialization:** Provide the necessary infrastructure and incentives to convert academic research and federal R&D awards into patents, ventures, and high-value products.
- **Collaboration:** Utilize the 2030 Alabama Science and Technology Plan to coordinate state, academic, and private sector resources toward shared high-priority research areas.

Vision

Alabama will position itself as a premier destination for science, technology, and high-tech industry in the Southeast.

Mission

The Alabama EPSCoR academic research institutions will elevate and coordinate work to advance STEM education, research, and innovation that drive high-tech industry growth and mission-critical technology work across the state of Alabama.

Strategy

The strategy centers on **six high-priority research areas** that build on Alabama's core research strengths, align with industry needs, and leverage federal R&D investment priorities. Alabama's six high-priority research areas are: (1) AI and Quantum Computing, (2) Biotechnology

and Biomedical Sciences, (3) Materials and Manufacturing Science, Batteries, (4) Robotics, Autonomy, and Automation, (5) Space and Unmanned Vehicles, and (6) Agriculture, Forestry, Fisheries, Water Systems, and Coastal Resilience.

Research in these fields will bolster Alabama's target industries through **three distinct growth pathways**: (1) STEM workforce development, (2) R&D, and (3) technology commercialization. These **four industries**, identified by Catalyst, the Alabama Department of Commerce's strategic economic growth plan, and backed by the Alabama Growth Alliance, are: Transportation and Logistics, Defense and Aerospace, Bioscience and Biomanufacturing, and Agriculture, Forestry, and Bio-Based Products.¹

The 2030 strategy aims to advance the following goals to harness Alabama's work in the six high-priority research areas for industry sector growth:

1. Diversify and expand research activity.
2. Increase applied research activity with companies and government agencies.
3. Increase translation and innovation activity.
4. Increase the number of STEM graduates in high-demand fields.
5. Support the growth of R&D-intensive companies.
6. Strengthen educational outreach and community engagement.

They are presented in the graphic on the next page.

¹ For example, Transportation and Logistics is supported by high-priority research areas (HPRAs), such as Materials and Manufacturing Sciences, Batteries; Robotics, Autonomy, and Automation; and Space and Unmanned Vehicles; Defense and Aerospace is supported by AI and Quantum Computing, Materials and Manufacturing Sciences, Batteries; Robotics, Autonomy, and Automation; and Space and Unmanned Vehicles; and so on.

Figure 1

Alabama’s 2030 High-Priority Research Areas, Strategic Plan Goals, and Growth Pathways Aligned to the State’s Target Industries



The Impact

Implementing this plan will deliver the following results by 2030.

		Now 2024	Future 2030*	
Impact Areas				
1 Research Competitiveness	Business R&D expenditures**	\$5.3 BN	\$10.9 BN	
	Academic R&D expenditures	\$1.8 BN	\$2.3 BN	
	Industry-sponsored R&D expenditures	\$85.7 M	\$95.7 M	
2 STEM Workforce	Employment in science and engineering (S&E) jobs	130,820	147,194	
	Employment in S&E-related (mainly health care) jobs	156,410	171,842	
	Employment in skilled technical jobs	410,730	416,801	
3 STEM Degrees	S&E-Related (non-Health)†	Certificates	7,022	8,045
		Associate degrees	1,438	1,477
		Bachelor's degrees	401	697
		Master's degrees	44	107
		Doctoral degrees	3	3
	S&E	Certificates	914	1,512
		Associate degrees	318	354
		Bachelor's degrees	10,379	10,474
		Master's degrees	3,264	4,245
		Doctoral degrees	749	827
	Health Sciences	Certificates	3,585	3,443
		Associate degrees	2,960	2,948
		Bachelor's degrees	4,505	4,778
		Master's degrees	3,073	3,222
		Doctoral degrees	1,763	2,042
4 R&D-Intensive Companies	Employment in R&D-intensive manufacturing	88,156	93,568	
	Employment in R&D-intensive services	44,508	48,825	
	Number of Alabama patenting entities	301	291	
	Patents awarded	674	615	
5 Technology Commercialization	Number of SBIR/STTR awards**	130	128	
	Value of SBIR/STTR awards**	\$94.7 M	\$119.0 M	
	5-year count of VC deals**	522	716	
	5-year value of VC investment**	\$1.8 BN	\$3.3 BN	

* RTI projected Alabama's 2030 performance on impact metrics by halving its 2019-2024 (or latest available years) compound annual growth rate. See the appendix (figure 31) for growth rates.

** The most recent available data for business R&D expenditures are from 2023; the most recent available data for SBIR/STTR and VC are from 2025. Due to cyclical volatility, RTI analyzed and compared 5-year totals for VC: 2016-2020 and 2021-2025.

† S&E-related (non-health) programs span a wide range of fields, from technical certificates like welding and manufacturing technician to bachelor's and graduate-level degrees in areas including aviation management, homeland security, and math and science education. See the appendix (figures 6-12) for a complete list.

Purpose

Alabama EPSCoR selected RTI International to facilitate the development of its next 5-year statewide Science and Technology Plan. Building on the foundation of the state's previous blueprints, Accelerate Alabama 2.0 and the Alabama EPSCoR State Science and Technology Roadmap, the updated 2030 plan identifies high-priority research areas that address key industry needs and leverage federal R&D investment priorities. Ultimately, the plan reflects the shared commitment of Alabama stakeholders to advance economic and job growth across the state through the production of STEM graduates, the performance of R&D, and engagement in technology commercialization.

The statewide Science and Technology Plan serves as both the foundational strategic planning document for major National Science Foundation (NSF) EPSCoR funding—the NSF EPSCoR Collaborations Optimizing Research (E-CORE) and EPSCoR Research Incubators in STEM Excellence (E-RISE) programs—and a science and technology blueprint for Alabama's education, workforce, research, and innovation leadership. By helping the Alabama EPSCoR Steering Committee and stakeholders coordinate and collaborate on shared priority areas for action, the plan will move the state closer to its vision of becoming a premier destination for science, technology, and high-tech industry in the Southeast.



Approach

This plan was developed in collaboration with the Alabama EPSCoR Office and the Alabama EPSCoR Steering Committee on an accelerated 3-month timeframe. The data collection, analysis, and interviews conducted for this study sought to answer the following key questions:

1. What are the size, characteristics, and past-5-year growth rates of Alabama's R&D-intensive manufacturing and services industries? Which STEM jobs are growing the fastest? Where are there gaps in the STEM talent pipeline?
2. What are Alabama's major STEM research strengths? How has Alabama's past-5-year growth rate compared to other EPSCoR states, and how well aligned are these areas to federal R&D funding priorities?
3. How does Alabama perform on technology transfer indicators? In which federal R&D priority areas is Alabama patenting? How much SBIR/STTR seed capital have Alabama companies attracted and how much VC investment?



Report Organization

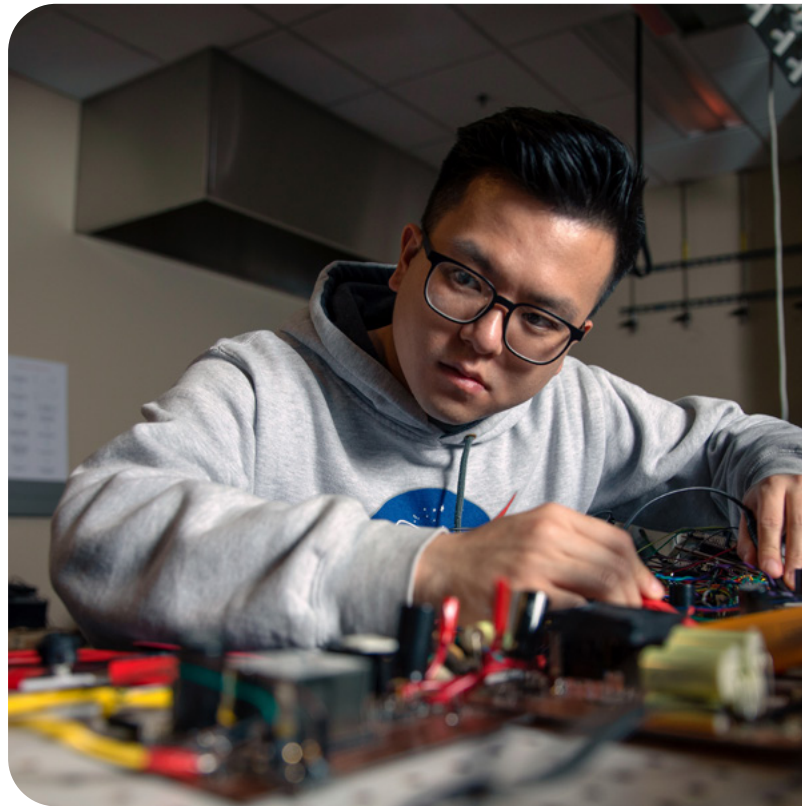
The first section of this report analyzes Alabama's current state strengths and weaknesses in four functional areas: (1) R&D-intensive industries, (2) STEM workforce, (3) research competitiveness, and (4) technology commercialization. The second section presents Alabama's 2030 statewide science and technology strategy, including vision, mission, goals, and actions. It also presents Alabama's high-priority research areas and target industries for the next 5 years. Finally, the report appendix includes national benchmarking and recent trends analysis for 30 science, technology, economic, STEM education, and research and innovation metrics that are shaping Alabama's national competitiveness across the four Plan categories.

To secure a competitive position in the global economy, Alabama must increasingly prioritize innovation-led growth centered on high-impact research and advanced technological development.

By cultivating a robust ecosystem that bridges the gap between academic discovery and industrial application, the state is transforming its economic landscape from traditional manufacturing toward a knowledge-based powerhouse. The following analysis presents Alabama’s current strengths and weaknesses across key indicators of this transition, examining the performance of R&D-intensive industries, the imperative of a skilled STEM workforce, the state’s research competitiveness, and the evolving impact of its technology commercialization efforts.

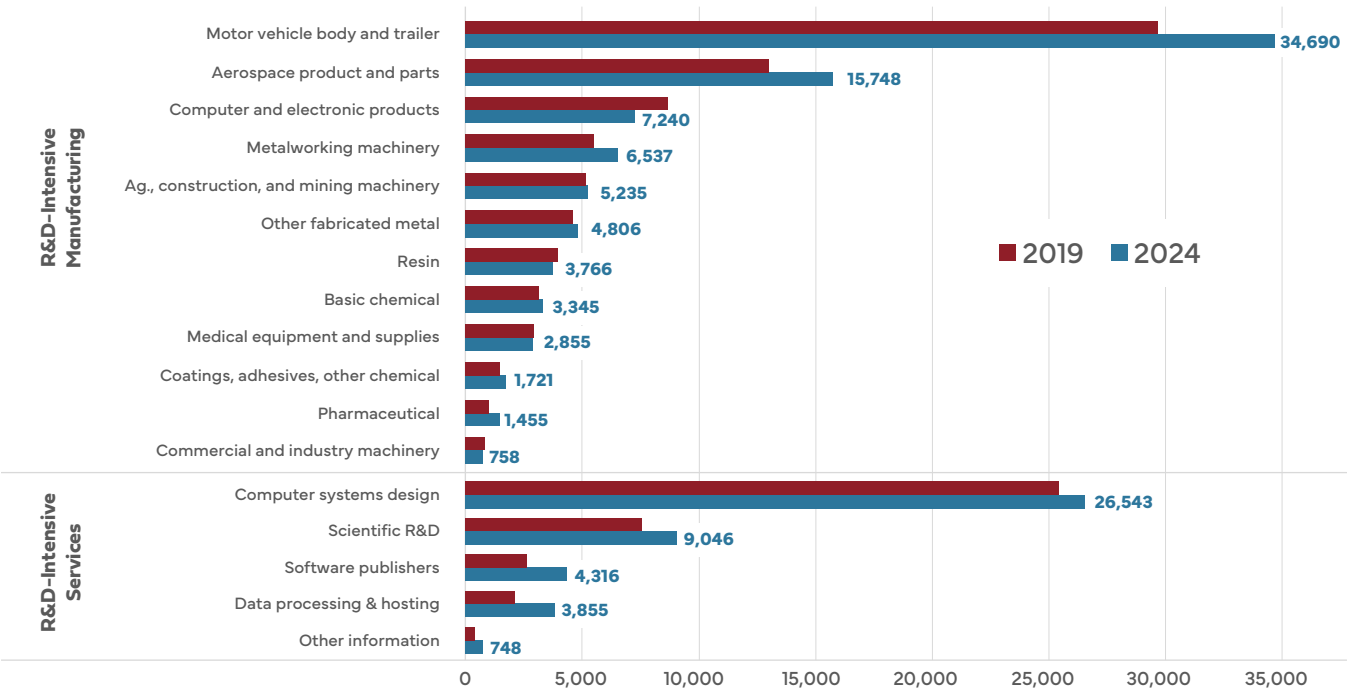
R&D-Intensive Industries

Manufacturing, real estate, professional and technical services, health care, and retail are Alabama’s top five industries, as measured by real gross domestic product (GDP). Alabama’s R&D-intensive industries—a subset of manufacturing and service industries characterized by higher rates of R&D activity—are a small but growing engine of the state’s economy. They are important barometers of Alabama’s future growth potential, because R&D-intensive firms and industries are correlated with higher rates of total factor productivity growth, innovation activity, and exports. In 2024, Alabama’s R&D-intensive industries employed 132,664 people, representing 10% of the state’s private-sector workforce. The sector has sustained an annual job growth rate of 2.3% over the past 5 years, bolstered by Alabama’s success in recruiting major companies and facilities such as Eli Lilly, ArcelorMittal, and Space Command, alongside significant expansions into the state by industry leaders such as Hubbell Corporation, Performance Drone Works, and Lockheed Martin.

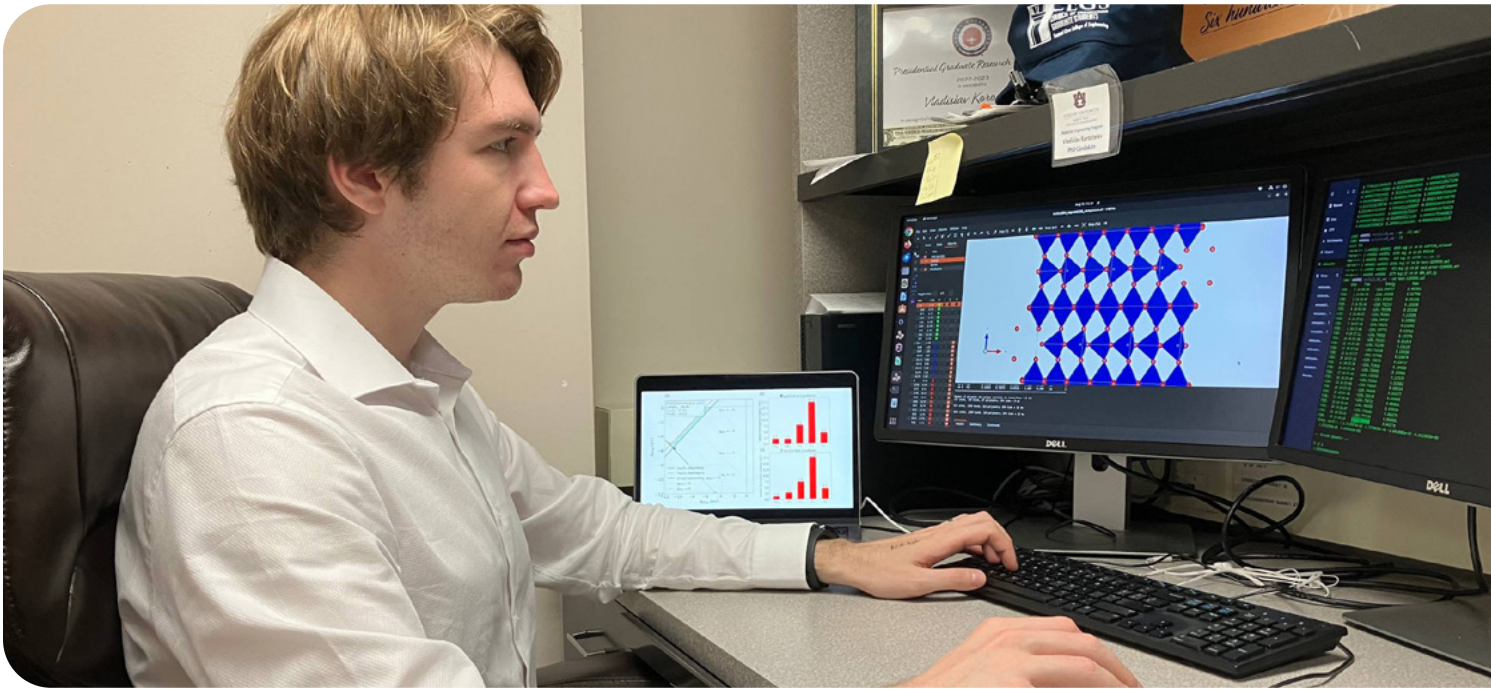


The figure below shows the overall growth in Alabama’s R&D-intensive manufacturing and services employment from 2019 to 2024.

Figure 2
Change in Employment in Alabama’s R&D-Intensive Industries, 2019 and 2024



Source: U.S. Bureau of Labor Statistics. (2025). Quarterly Census of Employment and Wages.



Strengths

- **Job growth in R&D-intensive industries has been strong:** From 2019 to 2024, employment in Alabama's R&D-intensive industries grew faster (2.4% per year) than total private sector employment (1.1% per year).
- **R&D-intensive services employment is growing faster than in R&D-intensive manufacturing, albeit from a smaller base:** R&D-intensive manufacturing (88,156 employees) employs twice as many people as R&D-intensive services (44,508), but R&D-intensive services grew faster (3.1% per year vs. 2.0% per year) over the past 5 years.
- **Alabama is actively recruiting companies, with notable successes:** The new \$6 billion Eli Lilly facility in Huntsville, the \$1.2 billion Arcelor Mittal electric steel facility in Mobile, and the relocation of the U.S. Space Command to Huntsville will further bolster employment growth in R&D-intensive industries.

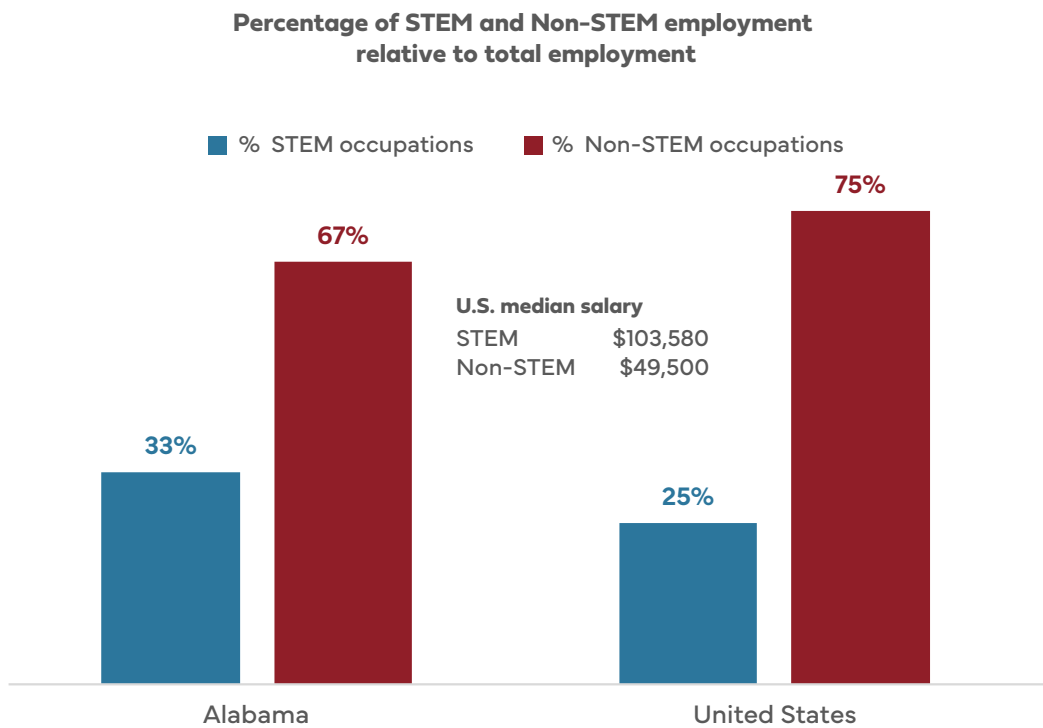
Weaknesses

- **Jobs declined in some R&D-intensive manufacturing industries:** Computer and electronics manufacturing lost 1,423 jobs, resins and synthetic rubber manufacturing lost 177 jobs, and commercial machinery manufacturing lost 81 jobs from 2019 to 2024.
- **Completion rates in some high-demand STEM degree fields are down:** There were 277 fewer engineering bachelor's degrees awarded in 2024 than in 2019, which had 2,781 engineering graduates. This is a risk for Alabama's science and engineering (S&E) workforce.

STEM Workforce

Employment in STEM jobs—those spanning science and engineering roles, health care, and the skilled trades—represent a third of all jobs in Alabama compared to 25% nationally. Across the U.S., STEM jobs are projected to grow faster (8% through 2034, compared to 3% for non-STEM) and pay more (\$103,580 versus \$49,500) than non-STEM jobs, as shown in the figure below. The continued growth of Alabama’s R&D-intensive manufacturing and services industries will be fueled or limited by the pipeline of STEM talent it produces and attracts. Alabama is currently experiencing critical labor shortages in STEM sectors, such as health care (e.g., nursing) and the advanced trades (e.g., welders and electricians). Looking forward, there are two pipeline risks to the Alabama STEM workforce: a 10% decline in engineering bachelor’s graduates from 2019 to 2024 and the 18% of Alabama youth and young adults (16-24 years of age) who are neither working nor studying. There are also misalignments between S&E degree production and demand by industry.

Figure 3
Share of Alabama and U.S. Employment in STEM versus Non-STEM Occupations, 2024



Source: U.S. Bureau of Labor Statistics (2025). Occupation Employment and Wage Statistics.

Strengths

- **Alabama has a large STEM workforce (697,960, or 33% of total). Over the past 5 years, STEM jobs have grown faster than all private-sector jobs:** Alabama employment in STEM jobs grew 1.7% per year, nearly double the rate for non-STEM employment (0.9% per year) from 2019 to 2024. Growth was driven by large increases in computer and mathematics jobs (13,190 workers added); engineering (5,760 added); health technicians (7,390 added); installation, maintenance, and repair (8,610 added); and construction and extraction occupations (5,360 added).
- **Since 2019, Alabama’s science and health degrees have outpaced degrees earned in non-S&E fields:** Bachelor’s degrees in science grew by 1.1% annually (to 7,785 degrees awarded) and in health sciences by 2% (to 4,505), while non-S&E degrees declined by 0.9% (to 14,681). Meanwhile, master’s degrees in science, engineering, and health sciences saw consistent growth, reaching 2,449, 815, and 3,073 graduates respectively, by 2024.
- **Alabama has expanded completions of high-demand credentials since 2019:** In 2024, Alabama institutions of higher education awarded 1,301 welding certificates (+35 certificates since 2019), 522 electrician certificates (+297), and 517 manufacturing engineering technician certificates (+39). Among these, only electrician certificates were up substantially.

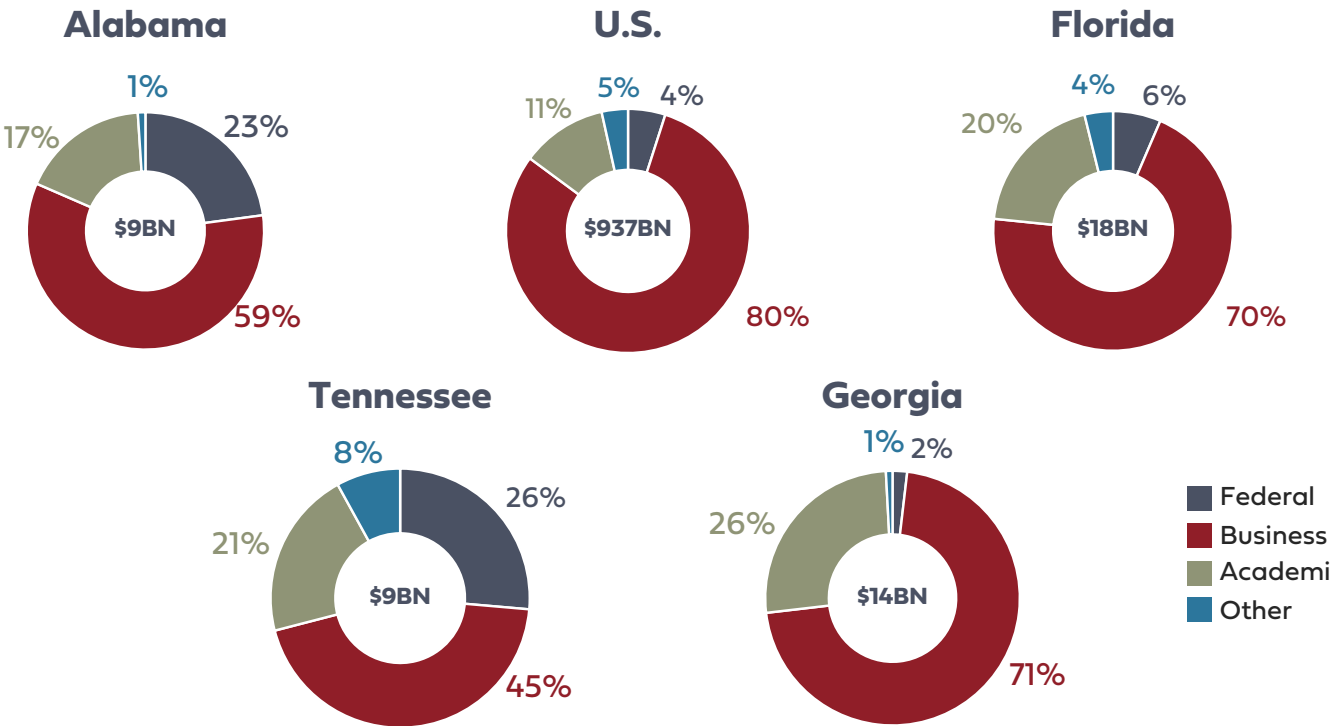
Weaknesses

- **Despite growth in many STEM 2- and 4-year degree completions, Alabama is experiencing acute worker shortages in some STEM occupations:** Nurses and nursing assistants, welders, and electricians are in short supply. While Alabama is taking steps to expand enrollment, it will take time for recent graduates to gain the experience needed for these roles.
- **There are misalignments between S&E degree production and industry demand in some fields:** Bachelor’s degrees awarded in biological and biomedical sciences (+314 to 2,213), psychology (+245 to 1,751), and computer science (+189 to 948) grew, but other fields, such as engineering (-277 to 2,504) and mathematics and statistics (-107 to 195) declined from 2019 to 2024.
- **Alabama’s workforce participation rate (57.6%) is lower than the U.S. average (62.4%). The state also has a high share of 16- to 24-year-olds who are neither working or in school:** A statewide survey conducted by the Alabama Workforce Council and the Governor’s Office of Education and Workforce Transformation found that 90,000 people—nearly one in five Alabama youths—are disconnected from work and higher education, despite a very low unemployment rate.

Research Competitiveness

Research is the engine of innovation: It teaches the next generation of scientists and engineers how to rigorously test hypotheses and turn inquiry into discovery. While academia fosters this inquiry-based foundation, the private sector performs R&D that improves existing products and brings new products into the marketplace. Companies perform 80% of U.S. R&D to bring products and mission-critical technologies to market. Alabama ranks 26th nationally in total R&D spending (\$9.1 billion), with 59% coming from business (\$5.3 billion), 23% from federal agencies (\$2.1 billion), 17% from academia (\$1.6 billion), and 1% from other sectors (\$100 million), as shown in Figure 4. Alabama’s future growth depends on its research talent and R&D-performing sectors. In 2024, Alabama’s eight public PhD-granting institutions awarded 72% of the state science bachelor’s degrees and 100% of the state’s doctoral engineering degrees.

Figure 4
Total R&D Expenditures by R&D Performing Sector in Alabama, the U.S., and Select States, 2023



Source: National Center for Science and Engineering Statistics. (2026). National Patterns of R&D Resources.



Strengths

- **Alabama ranks second in the Southeast for R&D intensity (2.92% of GDP). Business R&D spending (\$5.3 billion) grew by 18.9% per year over the past 5 years.** By comparison, the U.S. average R&D intensity is 3.37%. To maintain or improve this competitive standing, Alabama must ensure its R&D expenditures continue to grow at a faster rate than the GDP.
- **Alabama ranks first in academic R&D expenditures among EPSCoR states.** Alabama's academic R&D grew by 9.4% per year—2.5 times the average rate of growth of other EPSCoR states (3.8% per year). In 2024, Alabama academic R&D spending totaled \$1.8 billion.
- **Federal R&D performance in Alabama is very high.** Alabama ranks fifth nationally for federal R&D expenditures. From 2018 to 2023, Alabama's federal R&D grew 6.3% per year to \$2.1 billion. The national average was \$789 million.

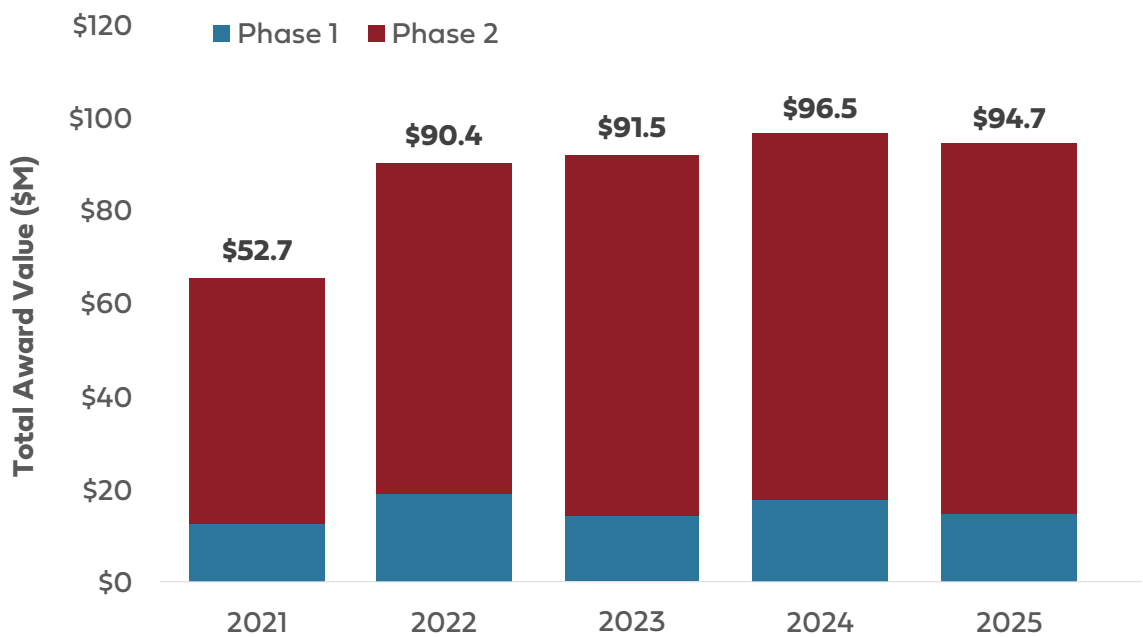
Weaknesses

- **Alabama needs more R&D-intensive companies:** Businesses perform 80% of U.S. R&D, and Alabama needs more business-led R&D growth. In 2023, Alabama ranked 24th for business R&D—behind 17th-ranked Georgia and 15th-ranked Virginia, but ahead of South Carolina (32nd) and Kentucky (38th).
- **The industry-sponsored share of R&D performed by Alabama research universities is below the national average:** In 2024, industry accounted for 5.6% (or \$34.2 million) of total academic R&D among U.S. research universities with \$100 million or more of R&D spending. Among Alabama's eight public research universities, only the University of Alabama at Birmingham (UAB) reported industry-sponsored R&D (\$71.1 million) above the U.S. average (8.2%), which can be attributed to the large number of clinical trials in which UAB is engaged.

Technology Commercialization

Commercializing new technology drives both industrial competitiveness and national security and mission-oriented objectives. While Alabama’s patent and trademark rankings remain low (44th for patents and 47th for trademarks per 100,000 residents, respectively), its innovation profile is strengthening. Alabama is patenting in critical technology areas, such as high-performance computing, biotechnology, and advanced energy and industrial efficiency technologies. Alabama is also making progress in launching new ventures and attracting early-stage capital. In 2025, Alabama startups won a sizable number of SBIR/STTR awards, totaling \$94.7 million. Its 3-year average SBIR/STTR funding relative to the size of its economy ranks Alabama eighth nationally. Early-stage companies are also raising a growing number of VC rounds and investment. VC investment in Alabama companies grew from \$521.7 million invested in 283 deals from 2016 to 2020 to \$1.753 billion invested in 522 deals from 2021 to 2025.

Figure 5
Alabama SBIR/STTR Total Award Value by Phase, 2021-2025



Source: U.S. Small Business Administration. (2026). SBIR/STTR Award Database.

Strengths

- **Leading companies by patents granted in Alabama are Boeing and Blue Origin (aerospace), Altec (electric utility equipment), and Hubbell Power Systems (electrical and electronic products manufacturers).** These companies generated 42 patents in 2024 and 71 in 2025 through quarter 3.
- **Alabama is also patenting in areas aligned to the administration's R&D funding priorities.** These include high-performance computing (95 patents), biotechnology (73 patents), advanced energy and industrial efficiency technologies (47 patents) and artificial intelligence (AI), machine learning, and autonomy (46 patents). See the appendix for the full list of patents by critical technology area.
- **Driven by Phase 2 awards, Alabama SBIR/STTR awards are growing.** SBIR/STTR awards grew from \$52.7 million in 2021 to \$94.7 million in 2025. From 2021 to 2025, Phase 2 awards composed 38% of total SBIR/STTR awards.
- **VC activity is up significantly compared to the previous 5-year period.** VC investment in Alabama companies grew from \$521.7 million invested in 283 deals from 2016 to 2020 to \$1.8 billion invested in 522 deals from 2021 to 2025.

Weaknesses

- **Alabama ranks 44th for patents and 47th for trademarks per 100,000 residents,** although it ranks 24th in business R&D expenditures. Alabama inventors produced nine patents and 19 trademarks per 100,000 residents. This is more than South Carolina's and Tennessee's 17 patents per 100,000 residents, but fewer than Georgia's and Florida's 22 and 19 patents per 100,000 residents, respectively.
- **Since its peak year in 2021, Alabama patents have been trending downward.** In 2021, Alabama inventors produced 752 patents. Year-over-year declines in patents granted resulted in 674 patents granted in 2024.
- **There is limited lab space for R&D-intensive startups.**



Forward-Looking Goals and Initiatives

1. Diversify and expand research activity.

- **Support faculty:** Identify ways to provide more release time for research-aspiring and research-active faculty at emerging research institutions.
- **Optimize operations:** Improve research infrastructure and administration efficiency and capacity.
- **Expand graduate programs:** Increase graduate enrollment, especially of U.S. citizens, to support federally supported research.
- **Secure major funding:** Win large, competitive research center awards by emphasizing team science (multidisciplinary, multi-institution, multi-state).
- **Strengthen research partnerships:** Collaborate more effectively with federal labs and military installations such as the Department of War (DoW), Department of Energy (DoE), and National Aeronautics and Space Administration (NASA).

2. Increase applied research activity with companies and government agencies.

- **Deepen economic partnerships:** Continue building relationships with the Economic Development Partnership of Alabama (EDPA), Innovate Alabama, BioAlabama, the Alabama Department of Commerce, and local economic development organizations to support company recruitment and technical assistance.

- **Develop unique assets that attract companies:** Create a “data lake” that attracts companies to train AI on these data; build out lab space for companies in research parks.
- **Increase visibility of technical expertise:** Create AI tools to better connect industry, government, and academia by identifying collaboration opportunities with researchers who have specialized expertise and laboratories.
- **Incentivize faculty:** Encourage update promotion and tenure guidelines to give scholarly credit for industry-sponsored research, classified work, and other applied work that cannot be published through traditional scholarly outlets.
- **Modernize faculty hiring:** Prioritize industry needs over a “replacement mentality” by aligning new hires with Alabama’s economic growth strategy.

3. Increase translation and innovation activity.

- **Maximize entrepreneurship training:** Expand participation in the NSF-funded Southeast Innovation Corps (I-Corps) and local incubator/accelerator programs.
- **Support early-stage technology commercialization:** Increase SBIR/STTR matching funds provided by Innovate Alabama.

- **Map academic intellectual property:** Partner with EDPA to build AI-powered tools for helping entrepreneurs and companies track university-developed intellectual property.
- **Build a statewide tech transfer network:** Form a coalition of Technology Transfer Offices to collaborate on common challenges and share ideas and best practices.

4. Increase the number of STEM graduates in high-demand fields.

- **Identify gaps:** Collect and analyze enrollment and completions data by STEM field against workforce demand.
- **Align curriculum:** Collaborate with industry to tailor training and retraining of workers.
- **Expand programs:** Partner with the Alabama Commission for Higher Education and the Alabama Department of Workforce (ADOW) to expand certificates and degrees in high-demand job fields.
- **Engage K–12 students early:** Boost experiential, hands-on STEM learning inside and outside K–12 classrooms to build future capacity for research and innovation.

5. Support the growth of R&D-intensive companies.

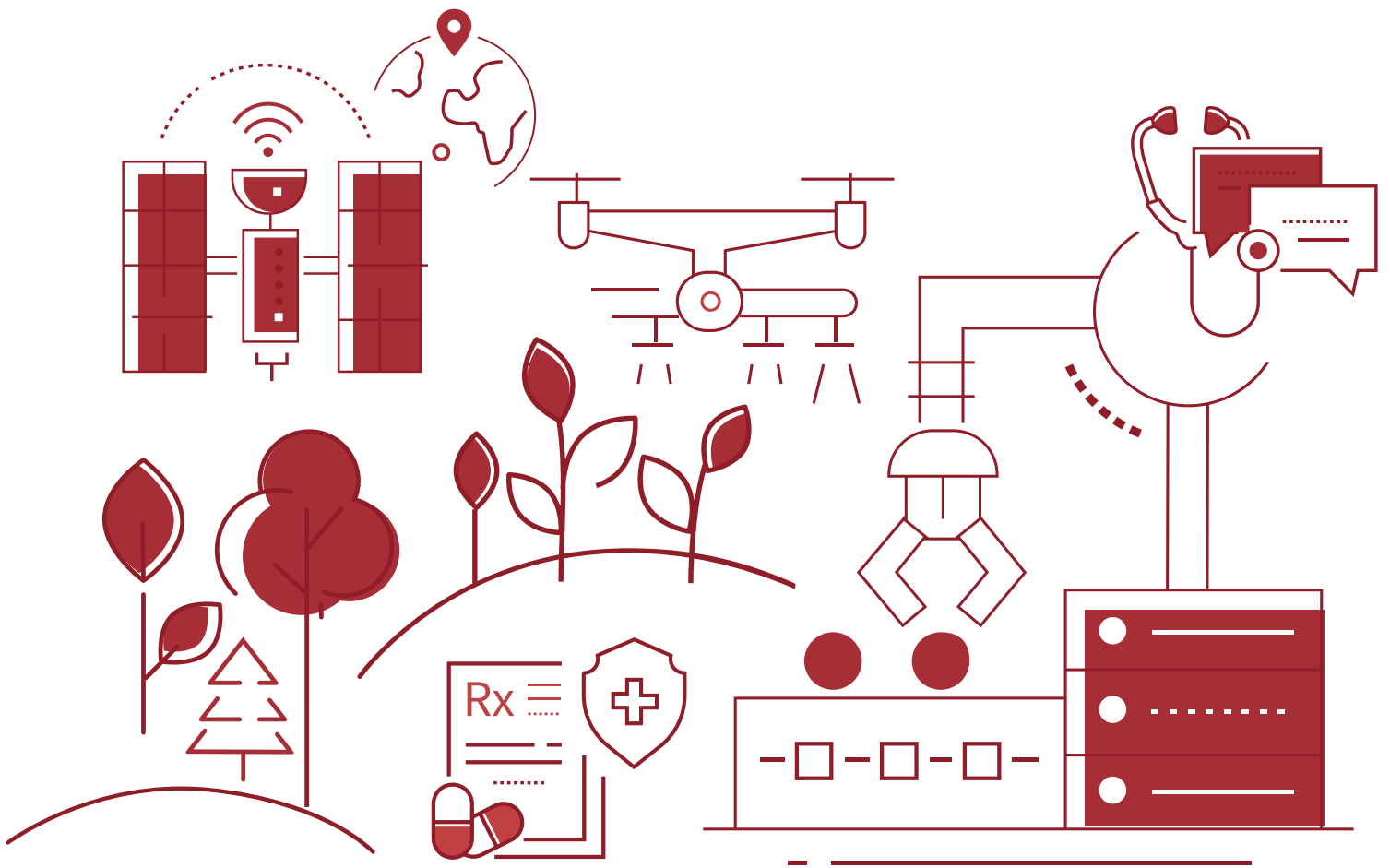
- **Cultivate a stronger ecosystem for new ventures:** Collaborate with the Innovation Portal, Hudson Alpha, Southern Research Institute, and other research and venture development organizations on new ventures.

- **Recruit executive talent:** Develop a strong national CEO network and incentivize Alabama CEOs with startup experience to return to Alabama.
- **Expand risk capital:** Engage with angel investors and VC funds.

6. Strengthen educational outreach and community engagement.

- **Develop an Alabama EPSCoR STEM economic development working group:** Develop a convening body to work with the ADOW, EDPA, and local economic development organization on industry-aligned STEM workforce development.
- **Increase external funding to support STEM summer experiences, research experiences, and scholarships:** Pursue NSF, DoW, NASA, and other grants to support undergraduate research experiences, summer STEM experiences for high school students, and bridging from community college to 4-year universities.
- **Build collaborations with K–12 and STEM-focused nonprofits and professional organizations:** Partner with organizations like the Space and Rocket Center, Dauphin Island Sea Lab, EdFarm, Sloss Tech, and Future Engineers of America.
- **Establish bilateral partnership agreements with Alabama companies:** Foster research, technical consulting, and student engagement with companies to expand university-industry connections.

Appendix



List of Contributing Stakeholders

(in alphabetical order)

Research Universities

Bryan Boudouris, PhD, Vice Chair, Alabama EPSCoR, Vice President for Research,
The University of Alabama at Birmingham

Christopher S. Brown, PhD, Vice President for Research, University of Alabama at Birmingham

Majed Dweik, PhD, Chair, Alabama EPSCoR, Vice President of Research and Economic Development,
Alabama A&M University

Christopher Lawson, PhD, Executive Director, Alabama EPSCoR, Professor of Physics,
University of Alabama at Birmingham

Robert Lindquist, PhD, Vice President for Research and Economic Development, University of Alabama in Huntsville

Allen Parrish, PhD, Vice President of Research and Economic Development, University of South Alabama

Steven Taylor, PhD, PE, Senior Vice President, Research and Economic Development, Auburn University

Timothy Turner, PhD, Vice President for Research, Sponsored Programs and Innovation, Tuskegee University

Kennedy Wekesa, PhD, Associate Provost for Academic Affairs, Alabama State University

Innovation and Economic Development

Cynthia Crutchfield, CEO, Innovate Alabama

Miller Girvin, President, Economic Development Partnership of Alabama

State Government

Franklin Johnson, Chief, Workforce Pathways Division, Alabama Department of Workforce

Robin McGill, PhD, Deputy Director of Academic Affairs, Alabama Commission on Higher Education

Ellen McNair, Secretary, Alabama Department of Commerce

Cynthia McCarty, PhD, Acting Director, Alabama STEM Council, Alabama Department of Workforce

Greg Reed, Secretary, Alabama Department of Workforce

Figure 1

Research and development (R&D)-intensive industries are manufacturing and service industries that have high and medium-high shares of R&D expenditures as a percentage of their value-added output, or gross domestic product (GDP). Nationally, R&D-intensive industries account for \$3.3 trillion, or 11%, of the U.S. GDP.¹ This figure lists these industries and their estimated R&D intensities.

Definition of High and Medium-High R&D-Intensive Industries in the United States

NAICS 2022	Industry Title	R&D Intensity
High R&D Intensity: Manufacturing		
3364	Aerospace product and parts mfg.	31.69%
3254	Pharmaceutical and medicine mfg.	27.98%
334	Computer and electronic products mfg.	24.05%
333314	Optical instrument and lens mfg.*	24.05%
Medium-High R&D Intensity: Manufacturing		
3361–3363	Motor vehicle mfg.	15.36%
3391	Medical equipment and supplies mfg.	9.29%
332913, 332991	Other fabricated metal products mfg.	7.89%
3331, 3332, 3334, 3335, 3336, 3339	Machinery mfg. (agricultural, industrial, metalworking, HVAC, power transmission)	7.89%
333310	Commercial and service industry machinery mfg.	7.89%
335	Electrical equipment, appliance, and component mfg.	6.22%
3251–3353, 3255–3256, 3259	Chemical mfg., excluding pharmaceuticals	6.52%
3365, 3369	Railroad and other transportation equipment mfg.	5.72%
High R&D Intensity: Services		
5132	Software publishers	28.94%
5417	Scientific research and development services	30.39%
Medium-High R&D Intensity: Services		
5415	Computer systems design and related services	5.92%
518	Data processing, hosting, and related services	5.92%
519	Other information services	5.92%

* 333314 was combined into 333310 in the 2022 NAICS revision.

HVAC = Heating, ventilation, and air conditioning; Mfg. = Manufacturing; NAICS = North American Industry Classification System

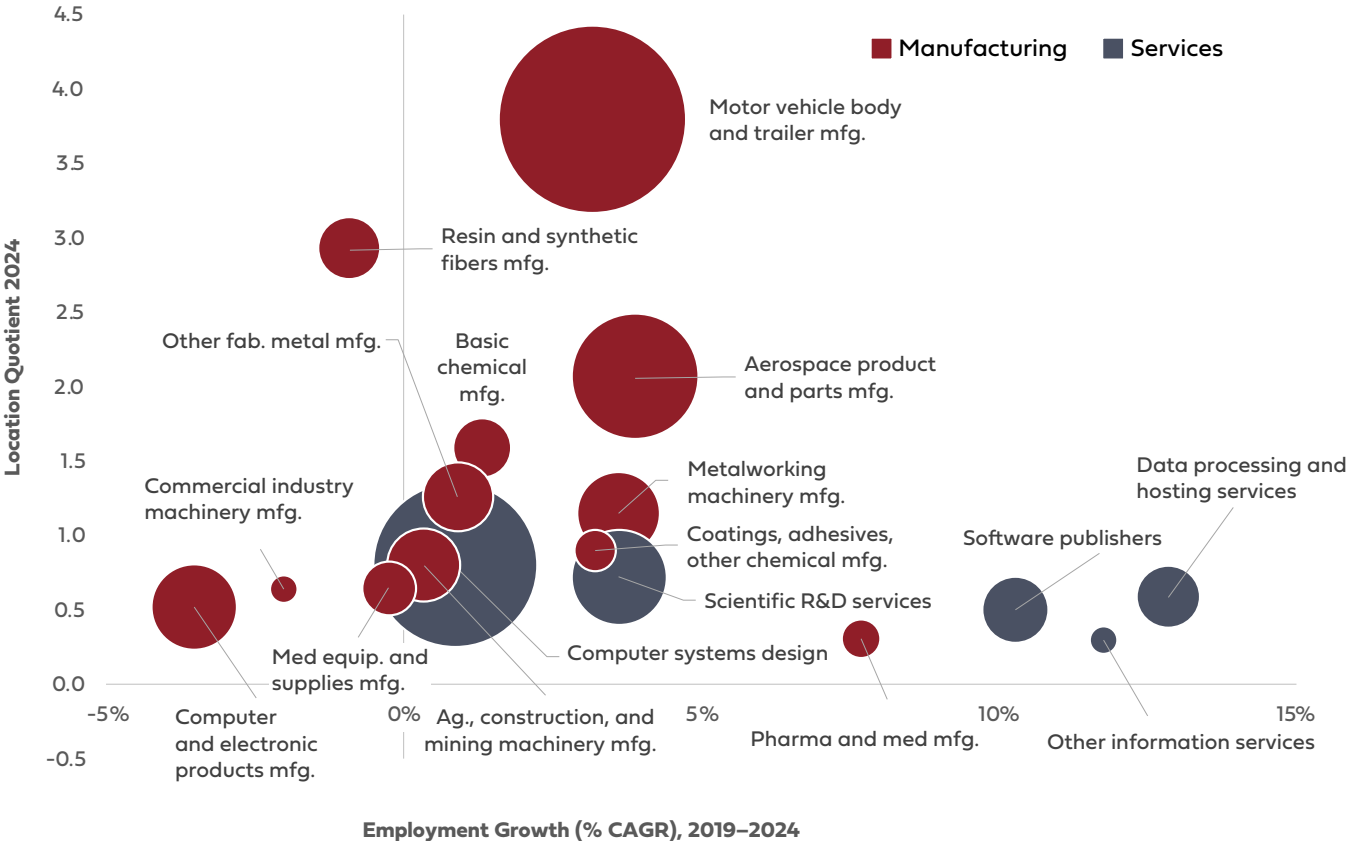
Sources: Galindo-Rueda, F. & Verger, F. (2016). Organization for Economic Cooperation and Development (OECD) taxonomy of economic activities based on R&D intensity. OECD Science, Technology, and Industry Working Papers. OECD Publishing; National Science Board (2022). SAKTI-3 Concordance for Knowledge and Technology Intensive Industry Employment.

¹ National Science Board, National Science Foundation (2026). Translation to Impact: U.S. and global science, technology, and innovation output. Science and Engineering Indicators 2026. NSB-2026-2. Alexandria, VA.

Figure 2

The sizes of the bubbles indicate the 2024 level of employment of each R&D-intensive manufacturing or services industry. The positioning of each bubble on the x-axis represents the compound annual growth rate (CAGR) of employment from 2019 through 2024. R&D-intensive services (data processing, software publishers, scientific R&D services, computer systems design) all grew over this 5-year period. Manufacturing employment grew in some industries (e.g., motor vehicles, aerospace, and pharmaceutical manufacturing), while declining in others (e.g., resins, commercial industry machinery, and computer and electronics manufacturing).

Alabama R&D-Intensive Industry Segment Employment Growth and Employment Concentration (Location Quotient), 2019–2024



Fab. = Fabricated; Mfg. = Manufacturing

Note: The location quotient measures how concentrated an industry’s employment is in a state or region compared to the national average.

Source: U.S. Bureau of Labor Statistics (2025). Quarterly Census of Employment and Wages, multiple years.

Figure 3

Over the past 5 years, all R&D-intensive industry employment in Alabama grew much faster (2.4% CAGR) than total private sector employment (1.1% CAGR). R&D-intensive services drove this growth, adding 6,319 jobs (3.1% CAGR from 2019 to 2024). R&D-intensive manufacturing also grew, adding 8,295 jobs, but at a slightly lower rate (2.0% per year). In 2024, Alabama's total R&D-intensive manufacturing employment (88,156 people) was double that of R&D-intensive services (44,508 people).

Size and Growth of Alabama's High-Tech Industry Segments, 2019, 2024, 5-Year Change, 5-Year CAGR, and 2024 Location Quotient

NAICS	Industry Title	2019	2024	5-Year Change	5-Year CAGR	2024 LQ
31-33	All Manufacturing	268,948	285,184	16,236	1.2%	1.65
	R&D-Intensive Manufacturing	79,861	88,156	8,295	2.0%	N/A
3362 3363	Motor vehicle body and trailer mfg.; Motor vehicle parts mfg.	29,691	34,690	4,999	3.2%	N/A
3364	Aerospace product and parts mfg.	13,010	15,748	2,738	3.9%	2.07
3252	Resin, synthetic rubber, and artificial and synthetic fibers and filaments mfg.	3,943	3,766	-177	-0.9%	2.93
3331 3339	Agriculture, construction, and mining machinery mfg.; Other general purpose machinery mfg.	5,147	5,235	88	0.3%	N/A
3251	Basic chemical mfg.	3,133	3,345	212	1.3%	1.59
3255 3259	Paint, coating, and adhesive mfg.; Other chemical product and preparation mfg.	1,469	1,721	252	3.2%	N/A
3254	Pharmaceutical and medicine mfg.	1,005	1,455	450	7.7%	0.31
3391	Medical equipment and supplies mfg.	2,892	2,855	-37	-0.3%	0.65
334	Computer and electronic products mfg.	8,663	7,240	-1,423	-3.5%	0.52
335	Metalworking machinery mfg.	5,475	6,537	1,062	3.6%	1.15
3329	Other fabricated metal mfg.	4,594	4,806	212	0.9%	1.26
33331	Commercial and service industry machinery mfg.	839	758	-81	-2.0%	0.64
	All Services	1,240,953	1,307,877	66,924	1.1%	N/A
	R&D-Intensive Services	38,189	44,508	6,319	3.1%	N/A
5415	Computer systems design and related services	25,434	26,543	1,109	0.9%	0.80
5417	Scientific research and development services	7,574	9,046	1,472	3.6%	0.72
518	Data processing, hosting, and related services	2,106	3,855	1,749	12.9%	0.59
5132	Software publishers	2,646	4,316	1,670	10.3%	0.50
519	Other information services	429	748	319	11.8%	0.30
	All R&D-Intensive Industries	118,050	132,664	14,614	2.4%	N/A
10	Total Private Sector Employment	1,622,460	1,717,475	95,015	1.1%	0.95

NAICS = North American Industry Classification System; LQ = Location quotient; mfg. = Manufacturing

Notes: The LQ shows Alabama's concentration of employment in an industry relative to the national average. The higher the concentration, the higher Alabama's specialization in this industry. All manufacturing includes all industries in NAICS 31, 32, and 33. All services includes all private sector service industries in NAICS 22, 42, 44, 45, 48, 49, 51, 52, 53, 54, 55, 56, 61, 62, 71, 72, and 81.

Source: U.S. Bureau of Labor Statistics (2025). Quarterly Census of Employment and Wages, multiple years.

Figure 4

Science, technology, engineering, and math (STEM) occupations include science and engineering (S&E), S&E-related (which are predominantly health care jobs), and skilled technical jobs. This figure shows the specific types of jobs included in each category based on the U.S. Bureau of Labor Statistics' definition of STEM occupations and the National Center for Science and Engineering Statistics' definition of the "skilled technical workforce."

STEM Occupation Definitions

S&E Occupations

- Computer and mathematics
- Surveyors, cartographers, and photogrammetrists
- Engineers
- Drafters, engineering technicians, and mapping technicians
- Life, physical, social scientists, and related work
- Life, physical, and social science technicians
- Math, computer science, engineering, and physical science teachers (postsecondary)
- Computer and information systems, architectural and engineering, and natural sciences managers
- Sales representatives, wholesale and manufacturing, technical and scientific products, and sales engineers

S&E-Related Occupations

- Diagnosing or treating practitioners (health care)
- Other health care practitioners and technical occupations
- Health technologists and technicians
- Medical and health services managers
- Architecture teachers (postsecondary)
- Health teachers (postsecondary)
- Architectural and civil drafters
- Architects (excluding naval architects)

Skilled Technical Occupations

- Supervisors of production workers
- Electrical, electronics, and electromechanical assemblers
- Bakers
- Metal workers and plastic workers
- Machinists
- Printing workers
- Textile, apparel, and furnishings, and wood workers
- Powerplant operators, distributors, and dispatchers
- Construction and extraction occupations
- Electrical and electronics equipment mechanics, installers, and repairers
- Vehicle and mobile equipment mechanics, installers, repairers
- All other installation, maintenance, and repair occupations

Note: The job titles listed in the "Skilled Technical" category are representative and do not represent the full list of occupations; the Standard Occupations Classification (SOC) codes used for this industry are the broad categories of 47, 49, and 51.

Sources: U.S. Bureau of Labor Statistics (2019). Attachment B: STEM definition options, SOC Policy Committee Recommendation to Office of Management and Budget; National Center for Science and Engineering Statistics (2022). Skilled technical workforce initiative.

Figure 5

Similar to the U.S., Alabama’s 2024 STEM employment was highest in skilled technical jobs (410,730 workers), followed by S&E-related (mostly health care) jobs (156,410 workers), and S&E jobs (130,820 workers). Alabama STEM employment grew 1.7% per year from 2019 to 2024, driven by large increases in computer and mathematics (13,190 new jobs), engineering (5,760 jobs), health technician occupations (7,390 jobs), installation, maintenance and repair (8,610 jobs), and construction and extraction occupations (5,360 jobs). S&E postsecondary teaching positions (-2.2%) and production and manufacturing jobs (-0.4%) declined during this period.

Alabama Employed in STEM Occupations, 2019, 2024, 5-Year Change, and 5-Year CAGR

Occupation	2019	2024	5-Year Change	5-Year CAGR
S&E	107,680	130,820	23,140	4.0%
Computer and mathematics	44,070	57,260	13,190	5.4%
Engineering	41,090	46,850	5,760	2.7%
Life, physical, and social sciences	8,790	9,960	1,170	2.5%
S&E management and sales	8,950	12,480	3,530	6.9%
S&E postsecondary teachers	4,780	4,270	-510	-2.2%
S&E-Related	133,870	156,410	13,220	3.2%
Health care practitioners	84,610	88,340	3,730	0.9%
Health technicians	44,140	51,530	7,390	3.1%
Medical and health services managers	D	9,320	N/A	N/A
Health and architect postsecondary teachers	3,090	4,370	1,280	7.2%
Architects and architectural drafters	2,030	2,850	820	7.0%
Skilled Technical	400,820	410,730	9,910	0.5%
Production or manufacturing	219,280	215,220	-4,060	-0.4%
Installation, maintenance, and repair occupations	98,500	107,110	8,610	1.7%
Construction and extraction	83,040	88,400	5,360	1.3%
STEM Total	642,370	697,960	46,270	1.7%
Non-STEM Total	1,331,800	1,393,520	61,720	0.9%
All Occupations	1,974,170	2,091,480	117,310	1.2%

D = Suppressed data.

Notes: Postsecondary biological science and chemistry teaching positions, which declined by 810 and 50 jobs, respectively, drove the decrease in S&E postsecondary teachers employment. Production/manufacturing employment declined by a net 4,060 jobs driven by a 9,200 job decline in “helpers–production workers,” a 4,490 decline in “all other” production workers, and a 3,160 decline in “slaughterers and meat packers.”

Source: U.S. Bureau of Labor Statistics (2025). Occupational Employment and Wage Statistics, multiple years.

STEM WORKFORCE PIPELINE: DEGREES AWARDED

Figure 6

STEM degrees belong to two major categories: S&E fields and S&E-related fields, including health sciences, as shown in this figure. Institutions of higher education report certificates and degrees completed to the National Center for Education Statistics Integrated Postsecondary Education Data System. The taxonomy for classifying S&E and S&E-related degrees comes from the National Center for Science and Engineering Statistics Taxonomy of Disciplines. Due to the large volume of degree completions in health sciences, RTI placed degrees in this field into a separate category.

STEM Degree Categories

S&E Degrees

- Agricultural sciences
- Biological and biomedical sciences
- Computer sciences
- Engineering, all fields
- Geosciences
- Math and statistics
- Natural resources
- Physical sciences
- Psychology
- Social sciences
- Interdisciplinary sciences

S&E-Related Degrees

- Engineering technologies and technicians
- Construction trade
- Health sciences
- Homeland security and fire protection
- Mechanic and repair technologies
- Precision production
- Science-related and science technologies
- S&E teacher education and professional development
- Transportation and materials moving

Health Sciences Degrees

- Allied health services
- Behavioral and mental health
- Dentistry and dental sciences
- Exercise science and kinesiology
- Health administration and policy
- Medical laboratory and imaging
- Medical and pre-medical
- Nursing
- Public and community health
- Rehabilitation and therapy professions

* RTI separated health sciences degrees into a separate category for analytical purposes.

Source: National Center for Science and Engineering Statistics (2025). Taxonomy of Science & Engineering and Science Disciplines.

Figure 7

In 2024, Alabama awarded 75,443 certificates, associate, bachelor’s, master’s, and doctoral degrees across all disciplines—6,483 more completions than in 2019. Together, S&E and S&E-related degrees accounted for 54% of these completions in 2024. At 15,264, S&E degrees represented 21% of degrees awarded in 2024—1,966 more than in 2019. Bachelor’s degrees (10,379) accounted for 66% of all S&E graduates. S&E master’s degrees had the highest rate of growth (9% per year), adding 1,138 degrees to total 3,264 degrees in 2024.

Alabama Total Degrees Awarded in S&E, S&E-Related (Non-Health Sciences), S&E-Related (Health Sciences), and Non-S&E Disciplines, 2019, 2024, 5-Year Change, and 5-Year CAGR

Degree Classifications	2019	2024	5-Year Change	5-Year CAGR (%)
Non-S&E	33,010	35,025	2,015	1.2%
Certificates and 12-month programs	4,082	5,978	1,896	7.9%
Associate degrees	6,603	6,231	-372	-1.2%
Bachelor’s degrees	15,336	14,681	-655	-0.9%
Master’s degrees	6,348	7,414	1,066	3.2%
Doctoral degrees	641	721	80	2.4%
S&E-Related (Health Sciences)	15,127	15,886	759	1.0%
Certificates and 12-month programs	3,836	3,585	-251	-1.3%
Associate degrees	2,980	2,960	-20	-0.1%
Bachelor’s degrees	4,086	4,505	419	2.0%
Master’s degrees	2,841	3,073	232	1.6%
Doctoral degrees (professional practice)	1,356	1,706	350	4.7%
Doctoral degrees (research scholarship)	28	57	29	15.3%
S&E	13,658	15,624	1,966	2.7%
Certificates and 12-month programs	408	914	506	17.5%
Associate degrees	266	318	52	3.6%
Bachelor’s degrees	10,222	10,379	157	0.3%
Master’s degrees	2,126	3,264	1,138	9.0%
Doctoral degrees	636	749	113	3.3%
S&E-Related (Non-Health Sciences)	7,165	8,908	1,743	4.5%
Certificates and 12-month programs	5,612	7,022	1,410	4.6%
Associate degrees	1,376	1,438	62	0.9%
Bachelor’s degrees	166	401	235	19.3%
Master’s degrees	11	44	33	32.0%
Doctoral degrees	–	3	N/A	N/A
Total	68,960	75,443	6,483	1.8%
S&E and S&E-Related Total	35,950	40,418	4,468	2.4%

Source: National Center of Education Statistics (2025). Integrated Postsecondary Education Data System Completions Survey, multiple years.

Figure 8

After bachelor's degrees, certificates and 12-month programs had the second-highest number of completions (17,499) in 2024. S&E-related certificates (non-health) were the dominant subcategory, with 7,022 completions (40% of all certificates and 12-month program completions) in 2024. From 2019 to 2024, this subcategory's CAGR was 4.6%, led by welding (1,301 completions), HVAC maintenance (550), and electrician programs (522). S&E-related health sciences certificates was the second-largest subcategory, with 3,585 completions—a decrease of 251 awards over the 5-year period. At 914, S&E certificates was the smallest subcategory, though it grew by 506 degrees from 2019, driven primarily by computer and information sciences programs (777 completions in 2024).

Alabama Certificates and 12-Month Programs Awarded in S&E and S&E-Related Disciplines, 2019, 2024, 5-Year Change, and 5-Year CAGR

Certificates and 12-Month Programs	2019	2024	5-Year Change	5-Year CAGR (%)
S&E-Related (Non-Health)	5,612	7,022	1,410	4.6%
Welder	1,266	1,301	35	0.5%
HVAC maintenance technician	268	550	282	15.5%
Electrician	225	522	297	18.3%
Manufacturing engineering technician	478	517	39	1.6%
Industrial mechanics technician	281	443	162	9.5%
Truck and commercial vehicle operator and instructor	389	357	-32	-1.7%
HVAC engineering technician	226	340	114	8.5%
Industrial electronics technician	297	332	35	2.3%
Engineering technology	370	324	-46	-2.6%
Carpentry	85	309	224	29.5%
Automotive mechanics technician	125	251	126	15.0%
Drafting and design technician	191	233	42	4.1%
Diesel mechanics technician	271	198	-73	-6.1%
Aircraft maintenance technician	255	170	-85	-7.8%
Aircraft powerplant technician	91	147	56	10.1%
Autobody and repair technician	124	137	13	2.0%
Automotive engineering technician	21	117	96	41.0%
Vehicle maintenance and repair technician	22	94	72	33.7%
Aerospace engineering technician	–	85	N/A	N/A
Tool and die technician	102	77	-25	-5.5%
Industrial technician	39	75	36	14.0%
Masonry	72	68	-4	-1.1%
Plumber	40	66	26	10.5%
Machine shop assistant	122	56	-66	-14.4%
Airline, pilot, and flight crew	20	34	14	11.2%
Building construction technician	–	28	N/A	N/A

Certificates and 12-Month Programs	2019	2024	5-Year Change	5-Year CAGR (%)
Cabinetmaking	59	27	-32	-14.5%
CNC machinist	–	22	N/A	N/A
Civil engineering technicians	7	20	13	23.4%
Marine maintenance technician	–	17	N/A	N/A
Construction engineering technician	43	16	-27	-17.9%
Building inspection	9	14	5	9.2%
Chemical technician	–	13	N/A	N/A
Precision metal working	38	11	-27	-22.0%
Instrumentation technician	6	10	4	10.8%
Aviation management and operations	–	8	N/A	N/A
Fire services administration	9	7	-2	-4.9%
Avionics maintenance technician	–	6	N/A	N/A
Science technicians	–	6	N/A	N/A
Electrical and communications engineering technician	11	5	-6	-14.6%
Pipefitting/pipefitter and sprinkler fitter	–	3	N/A	N/A
Water quality and wastewater treatment technician	–	3	N/A	N/A
Machinist	3	2	-1	-7.8%
Industrial production technicians	–	1	N/A	N/A
Small engine mechanics technician	19	–	N/A	N/A
Upholsterer	25	–	N/A	N/A
Environmental engineering technician	3	–	N/A	N/A
Non-S&E	4,082	5,978	1,896	7.9%
S&E-Related (Health Sciences)	3,836	3,585	-251	-1.3%
S&E	408	914	506	17.5%
Science	408	907	499	17.3%
Computer and information sciences	333	777	444	18.5%
Agricultural and veterinary sciences	40	82	42	15.4%
Social sciences	22	27	5	4.2%
Natural resources and conservation	10	13	3	5.4%
Interdisciplinary sciences	3	8	3	21.7%
Engineering	–	7	N/A	N/A
Total	13,938	17,499	3,561	4.7%

Notes: All certificates and degrees conferred are for the academic year, which runs from July 1 through June 30 of the following calendar year. In the table, 2024 data are for the academic year 2023–2024. A blank cell “–” indicates that no data were reported for that specific item or survey component by the institution. Reasons an institution may not report: a program may not have existed prior to 2024; there were no graduates/completions from a program in a given year; or the institution did not report to the Integrated Postsecondary Education Data System (IPEDS) in that year.

Source: National Center of Education Statistics (2025). Integrated Postsecondary Education Data System Completions Survey, multiple years.

Figure 9

In 2024, Alabama institutions awarded 10,947 associate degrees. Over a quarter (27%) of these degrees (2,960) were in S&E-related (health sciences) fields. S&E-related (non-health) programs were the next-largest STEM category (13% of total) with 1,438 degrees awarded, led by mechanics and repairers (201), industrial mechanics technician (200), and manufacturing engineering technician degrees (187). S&E was the smallest subcategory (3% of total), with 318 awards in 2024, which were mainly computer and information sciences associate degrees.

Alabama Associate Degrees Awarded in S&E and S&E-Related Disciplines, 2019, 2024, 5-Year Change, and 5-Year CAGR

Associate Degrees	2019	2024	5-Year Change	5-Year CAGR (%)
Non-S&E	6,603	6,231	-372	-1.2%
S&E-Related (Health Sciences)	2,980	2,960	-20	-0.1%
S&E-Related (Non-Health)	1,376	1,438	62	0.9%
Mechanics and repairers	156	201	45	5.2%
Industrial mechanics technician	115	200	85	11.7%
Manufacturing engineering technician	176	187	11	1.2%
Industrial electronics technician	189	143	-46	-5.4%
Engineering technology	138	130	-8	-1.2%
Industrial technician	52	65	13	4.6%
HVAC engineering technician	65	64	-1	-0.3%
Electrician	77	60	-17	-4.9%
Drafting technician	85	59	-26	-7.0%
Tool and die technician	56	52	-4	-1.5%
Automotive engineering technician	29	42	13	7.7%
Aircraft maintenance technician	23	38	15	10.6%
Aircraft powerplant technician	21	30	9	7.4%
Welder	5	28	23	41.1%
Instrumentation technician	23	19	-4	-3.7%
Electrical and communications engineering tech	35	19	-16	-11.5%
Automotive mechanics technician	19	19	0	0.0%
Civil engineering technicians	15	11	-4	-6.0%
Avionics maintenance technician	7	11	4	9.5%
Building construction technician	–	11	N/A	N/A
Computer numerical control machinist	–	10	N/A	N/A

Associate Degrees	2019	2024	5-Year Change	5-Year CAGR (%)
Fire services administration	9	8	-1	-2.3%
Construction engineering technician	18	8	-10	-15.0%
Airline, pilot, and flight crew	6	8	2	5.9%
Vehicle maintenance and repair technician	26	6	-20	-25.4%
Diesel mechanics technician	7	3	-4	-15.6%
Building inspection	3	3	0	0.0%
Industrial production technicians	7	1	-6	-32.2%
Composite materials technician	–	1	N/A	N/A
HVAC maintenance technician	2	1	-1	-12.9%
Machinist	2	–	N/A	N/A
Precision metal working	8	–	N/A	N/A
Nuclear power technology technician	2	–	N/A	N/A
S&E	266	318	52	19.5%
Science	266	318	52	19.5%
Computer and information sciences	226	286	60	26.5%
Agricultural and veterinary sciences	35	30	-5	-14.3%
Natural resources and conservation	2	2	0	0.0%
Social sciences	3	–	N/A	N/A
Engineering	–	–	N/A	N/A
Total	11,225	10,947	-278	-2.5%

Notes: All certificates and degrees conferred are for the academic year, which runs from July 1 through June 30 of the following calendar year. In the table, 2024 data are for the academic year 2023–2024. A blank cell “–” indicates that no data were reported for that specific item or survey component by the institution. Reasons an institution may not report: a program may not have existed prior to 2024; there were no graduates/completions from a program in a given year; or the institution did not report to IPEDS in that year.

Source: National Center of Education Statistics (2025). Integrated Postsecondary Education Data System Completions Survey, multiple years.

Figure 10

In 2024, Alabama institutions awarded nearly 30,000 bachelor’s degrees across all fields. From 2019 to 2024, the number of non-S&E bachelor’s degrees awarded declined by 655, while S&E bachelor’s grew by 157, S&E-related (health sciences) grew by 419, and S&E-related (non-health) grew by 235. In 2024, bachelor’s degrees in science totaled 7,875, compared to 2,504 in engineering. From 2019 to 2024, engineering bachelor’s declined by 277, while bachelor’s in science increased by 434 degrees, led by biological and biomedical sciences (+314 degrees), psychology (+245 degrees), and computer and information sciences (+189 degrees). Bachelor’s degrees in science fell by 159 in social science and by 107 in mathematics and statistics.

Alabama Bachelor’s Degrees Awarded in S&E and S&E-Related Disciplines, 2019, 2024, 5-Year Change, and 5-Year CAGR

Bachelor’s Degrees	2019	2024	5-Year Change	5-Year CAGR (%)
Non-S&E	15,336	14,681	-655	-0.9%
S&E	10,222	10,379	157	0.3%
Science	7,441	7,875	434	1.1%
Biological and biomedical sciences	1,899	2,213	314	3.1%
Psychology	1,506	1,751	245	3.1%
Social sciences	1,795	1,636	-159	-1.8%
Computer and information sciences	759	948	189	4.5%
Interdisciplinary sciences	369	328	-41	-2.3%
Physical sciences	337	273	-64	-4.1%
Agricultural and veterinary science	221	252	31	2.7%
Natural resources and conservation	136	201	65	8.1%
Mathematics and statistics	302	195	-107	-8.4%
Geosciences, atmospheric, and ocean sciences	117	78	-39	-7.8%
Engineering	2,781	2,504	-277	-2.1%
Mechanical engineering	847	708	-139	-3.5%
Civil engineering	359	330	-29	-1.7%
Aerospace engineering	214	310	96	7.7%
Chemical engineering	389	247	-142	-8.7%
Electrical and communications engineering	354	229	-125	-8.3%
Computer engineering	180	196	16	1.7%
Architectural engineering	116	166	50	7.4%
Industrial engineering	146	146	0	0.0%

Bachelor's Degrees	2019	2024	5-Year Change	5-Year CAGR (%)
Biomedical engineering	45	56	11	4.5%
Biological engineering	34	38	4	2.2%
Materials engineering	34	23	-11	-7.5%
Construction engineering	18	20	2	2.1%
Environmental engineering	9	13	4	7.6%
Metallurgical engineering	22	8	-14	-18.3%
Other engineering	8	6	-2	-5.6%
Engineering, general	–	6	N/A	N/A
Engineering physics	4	2	-2	-12.9%
Polymer engineering	2	–	N/A	N/A
S&E-Related (Health Sciences)	4,086	4,505	419	2.0%
S&E-Related (Non-Health)	166	401	235	19.3%
Aviation management and operations	16	89	73	40.9%
Engineering technology	20	88	68	34.5%
Airline, pilot, and flight crew	5	65	60	67.0%
Occupational safety and health technician	31	22	-9	-6.6%
Building inspection	–	12	N/A	N/A
Construction engineering technician	9	12	3	5.9%
Manufacturing engineering technician	–	10	N/A	N/A
Engineering-related technicians	36	10	-26	-22.6%
Electrical and communications engineering technician	5	4	-1	-4.4%
Electronic engineering technicians	–	2	N/A	N/A
Science and mathematics education	40	54	14	6.2%
Homeland security and fire protection	4	33	29	52.5%
Total	29,810	29,966	156	0.5%

Notes: All certificates and degrees conferred are for the academic year, which runs from July 1 through June 30 of the following calendar year. In the table, 2024 data are for the academic year 2023–2024. A blank cell “–” indicates that no data were reported for that specific item or survey component by the institution. Reasons an institution may not report: a program may not have existed prior to 2024; there were no graduates/completions from a program in a given year; or the institution did not report to IPEDS in that year.

Source: National Center of Education Statistics (2025). Integrated Postsecondary Education Data System Completions Survey, multiple years.

Figure 11

In 2024, Alabama institutions awarded 13,795 master’s degrees across all fields. S&E master’s degrees (3,264) represented 24% of the total, followed by S&E-related (health sciences) degrees at 22%, and S&E-related (non-health) degrees at 0.3%. Within S&E, master’s degrees in science grew by an 11.2% CAGR from 2019 to 2024, led by computer and information sciences (835 degrees added between 2019 and 2024). Engineering master’s degrees grew by 3.5%, led by aerospace engineering (increase of 62 degrees from 2019 to 2024).

Alabama Master’s Degrees Awarded in S&E and S&E-Related Disciplines, 2019, 2024, 5-Year Change, and 5-Year CAGR

Master’s Degrees	2019	2024	5-Year Change	5-Year CAGR (%)
Non-S&E	6,348	7,414	1,066	3.2%
S&E	2,126	3,264	1,138	9.0%
Science	1,441	2,449	1,008	11.2%
Computer and information sciences	233	1,068	835	35.6%
Biological and biomedical sciences	293	362	69	4.3%
Psychology	324	359	35	2.1%
Social sciences	237	262	25	2.0%
Agricultural and veterinary science	97	137	40	7.1%
Physical sciences	64	69	5	1.5%
Mathematics and statistics	76	65	-11	-3.1%
Natural resources and conservation	30	59	29	14.5%
Interdisciplinary sciences	53	50	-3	-1.2%
Geosciences, atmospheric, and ocean sciences	34	18	-16	-11.9%
Engineering	685	815	130	3.5%
Engineering, general	219	195	-24	-2.3%
Aerospace engineering	44	106	62	19.2%
Mechanical engineering	82	86	4	1.0%
Civil engineering	80	80	0	0.0%
Computer engineering	55	55	0	0.0%
Other engineering	11	47	36	33.7%
Industrial management	–	42	N/A	N/A

Master's Degrees	2019	2024	5-Year Change	5-Year CAGR (%)
Electrical and communications engineering	58	39	-19	-7.6%
Architectural engineering	28	30	2	1.4%
Industrial engineering	38	29	-9	-5.3%
Electrical and computer engineering	–	23	N/A	N/A
Chemical engineering	20	22	2	1.9%
Materials engineering	32	14	-18	-15.2%
Manufacturing engineering	–	13	N/A	N/A
Biological engineering	5	11	6	17.1%
Biomedical engineering	5	7	2	7.0%
Systems engineering	–	6	N/A	N/A
Metallurgical engineering	4	5	1	4.6%
Environmental engineering	1	4	3	32.0%
Polymer engineering	3	1	-2	-19.7%
S&E-Related (Health Sciences)	2,841	3,073	232	1.6%
S&E-Related (Non-Health)	11	44	33	32.0%
Homeland security and fire protection	7	39	32	41.0%
Technology and technical fields	3	5	2	10.8%
Science and mathematics education	1	–	N/A	N/A
Total	11,326	13,795	2,469	4.0%

Notes: All certificates and degrees conferred are for the academic year, which runs from July 1 through June 30 of the following calendar year. In the table, 2024 data are for the academic year 2023–2024. A blank cell “–” field “–” indicates that no data were reported for that specific item or survey component by the institution. Reasons an institution may not report: a program may not have existed prior to 2024; there were no graduates/completions from a program in a given year; or the institution did not report to IPEDS in that year.

Source: National Center of Education Statistics (2025). Integrated Postsecondary Education Data System Completions Survey, multiple years.

Figure 12

In 2024, Alabama institutions of higher education awarded 3,236 doctoral degrees across all fields, an increase of 575 from 2019. Over half (54%) were in S&E-related health sciences fields, which added 379 doctorates from 2019 to 2024. S&E doctorates accounted for 23% of total doctorates awarded by Alabama institutions in 2024: an increase of 113 doctorates from 2019. The physical sciences, biological and biomedical sciences, agricultural and veterinary sciences, geosciences, computer engineering, and aerospace engineering experienced the largest 5-year growth.

Alabama Doctoral Degrees Awarded in S&E and S&E-Related Disciplines, 2019, 2024, 5-Year Change, and 5-Year CAGR

Doctoral Degrees	2019	2024	5-Year Change	5-Year CAGR (%)
S&E-Related (Health Sciences)	1,384	1,763	379	5.0%
S&E	636	749	113	3.3%
Science	490	578	88	3.4%
Agricultural and veterinary science	199	218	19	1.8%
Biological and biomedical sciences	122	144	22	3.4%
Physical sciences	46	74	28	10.0%
Psychology	69	61	-8	-2.4%
Geosciences, atmospheric, and ocean sciences	6	21	15	28.5%
Mathematics and statistics	23	21	-2	-1.8%
Social sciences	10	16	6	9.9%
Computer and information sciences	7	14	7	14.9%
Interdisciplinary sciences and engineering	5	6	1	3.7%
Natural resources and conservation	3	3	0	0.0%
Engineering	146	171	25	3.2%
Mechanical engineering	22	25	3	2.6%
Computer engineering	12	23	11	13.9%
Electrical and communications engineering	27	23	-4	-3.2%
Chemical engineering	15	19	4	4.8%
Civil engineering	19	18	-1	-1.1%
Industrial engineering	14	18	4	5.2%

Doctoral Degrees	2019	2024	5-Year Change	5-Year CAGR (%)
Aerospace engineering	5	16	11	26.2%
Materials engineering	14	12	-2	-3.0%
Biomedical engineering	7	5	-2	-6.5%
Biological engineering	2	4	2	14.9%
Other engineering	2	4	2	14.9%
Systems engineering	4	2	-2	-12.9%
Architectural engineering	–	1	N/A	N/A
Polymer engineering	3	1	-2	-19.7%
Non-S&E	641	721	80	12%
S&E-Related (Non-Health)	–	3	N/A	N/A
Homeland security and fire protection	–	3	N/A	N/A
Total	2,661	3,236	575	22%

Notes: All certificates and degrees conferred are for the academic year, which runs from July 1 through June 30 of the following calendar year. In the table, 2024 data are for the academic year 2023–2024. A blank cell “–” indicates that no data were reported for that specific item or survey component by the institution. Reasons an institution may not report: a program may not have existed prior to 2024; there were no graduates/completions from a program in a given year; or the institution did not report to IPEDS in that year.

Source: National Center of Education Statistics (2025). Integrated Postsecondary Education Data System Completions Survey, multiple years.

Figure 13

In 2024, Alabama’s eight public PhD-granting institutions awarded 5,746 of 7,875 bachelor’s degrees in science—72% of the state total. The most bachelor’s degrees were conferred in biological and biomedical sciences, psychology, and social sciences. These same universities awarded 49% of Alabama’s master’s degrees in science. The top fields were computer and information sciences, biological and biomedical sciences, and psychology. For science doctorates, most degrees were granted in the physical sciences, biological and biomedical sciences, and agricultural and veterinary sciences.

Bachelor’s, Master’s, and Doctoral Science Degrees Awarded by Alabama EPSCoR Higher Education Institutions, 2024

Institution Name and Science Disciplines	Bachelor’s	Master’s	Doctoral
Auburn University	1,642	387	261
Biological and biomedical sciences	633	63	42
Psychology	212	63	22
Social sciences	200	20	8
Computer and information sciences	188	37	–
Agricultural and veterinary sciences	177	106	146
Natural resources and conservation	128	48	3
Interdisciplinary sciences	32	12	–
Physical sciences	31	13	19
Mathematics and statistics	24	16	10
Geosciences, atmospheric, and ocean sciences	17	9	11
The University of Alabama	1,644	224	80
Social sciences	604	63	6
Psychology	435	57	21
Biological and biomedical sciences	235	12	8
Computer and information sciences	108	23	3
Interdisciplinary sciences	86	13	3
Mathematics and statistics	53	24	7
Physical sciences	50	25	30
Natural resources and conservation	45	–	–
Geosciences, atmospheric, and ocean sciences	28	7	2
The University of Alabama at Birmingham	985	638	116
Biological and biomedical sciences	468	182	79
Psychology	234	15	12

Institution Name and Science Disciplines	Bachelor's	Master's	Doctoral
Computer and information sciences	108	377	5
Social sciences	104	38	1
Physical sciences	54	9	12
Mathematics and statistics	17	8	4
Interdisciplinary sciences	–	9	3
University of South Alabama	618	99	18
Biological and biomedical sciences	268	31	4
Interdisciplinary sciences	116	–	–
Psychology	89	14	6
Computer and information sciences	76	41	3
Social sciences	36	–	–
Geosciences, atmospheric, and ocean sciences	14	2	5
Mathematics and statistics	12	5	–
Physical sciences	7	–	–
Natural resources and conservation	–	6	–
The University of Alabama in Huntsville	342	149	20
Computer and information sciences	111	91	3
Biological and biomedical sciences	91	12	3
Physical sciences	63	21	11
Psychology	37	22	–
Mathematics and statistics	23	3	–
Social sciences	17	–	–
Geosciences, atmospheric, and ocean sciences	–	–	3
Alabama A&M University	196	50	11
Biological and biomedical sciences	84	9	–
Psychology	33	13	–
Computer and information sciences	25	11	–
Agricultural and veterinary sciences	24	16	9
Physical sciences	14	1	2
Social sciences	13	–	–
Mathematics and statistics	3	–	–
Tuskegee University	134	41	69
Agricultural and veterinary sciences	51	15	63
Biological and biomedical sciences	29	1	5

Institution Name and Science Disciplines	Bachelor's	Master's	Doctoral
Psychology	20	3	–
Social sciences	12	4	1
Computer and information sciences	10	15	–
Physical sciences	8	–	–
Natural resources and conservation	3	3	–
Mathematics and statistics	1	–	–
Alabama State University	185	15	3
Social sciences	72	4	–
Biological and biomedical sciences	51	3	3
Psychology	30	–	–
Computer and information sciences	19	7	–
Physical sciences	10	–	–
Mathematics and statistics	3	1	–
Total	5,746	1,603	578

EPSCOR = Established Program to Stimulate Competitive Research

Notes: All certificates and degrees conferred are for the academic year, which runs from July 1 through June 30 of the following calendar year. In the table, 2024 data are for the academic year 2023–2024. Institutions and S&E fields are sorted from highest to lowest number of bachelor's degrees awarded. A blank cell "--" field "—" indicates that no data were reported for that specific item or survey component by the institution. Reasons an institution may not report: a program may not have existed prior to 2024; there were no graduates/completions from a program in a given year; or the institution did not report to IPEDS in that year.

Source: National Center of Education Statistics (2024). Integrated Postsecondary Education Data System Completions Survey, multiple years.

Figure 14

In engineering, Alabama's eight public PhD-granting institutions awarded 2,499 bachelor's, 802 master's, and 171 doctorates in 2024. Mechanical engineering, civil engineering, and aerospace engineering were the top engineering fields across these universities. These eight institutions produced all 171 engineering doctorates in Alabama in 2024.

Bachelor's, Master's, and Doctoral Engineering Degree Completions by Alabama EPSCoR Higher Education Institutions, 2024

Institution Name and Engineering Disciplines	Bachelor's	Master's	Doctoral
Auburn University	945	288	89
Mechanical engineering	197	24	9
Architectural engineering	160	30	1
Civil engineering	115	31	7
Industrial engineering	97	29	15
Aerospace engineering	94	28	6
Chemical engineering	76	10	11
Electrical and communications engineering	66	22	12
Computer software engineering	62	–	–
Biological engineering	38	11	4
Computer engineering	23	44	17
Materials engineering	11	5	6
Other engineering	6	–	–
Industrial management	–	42	–
Engineering, general	–	11	–
Polymer engineering	–	1	1
The University of Alabama	662	122	43
Mechanical engineering	231	34	9
Chemical engineering	123	10	7
Civil engineering	97	20	9
Aerospace engineering	92	43	8
Electrical and communications engineering	48	6	6
Computer engineering	24	–	–
Construction engineering	20	–	–
Environmental engineering	13	4	–
Metallurgical engineering	8	5	–
Architectural engineering	6	–	–
Materials engineering	–	–	4
The University of Alabama in Huntsville	466	139	22
Mechanical engineering	121	–	6
Aerospace engineering	116	35	2

Institution Name and Engineering Disciplines	Bachelor's	Master's	Doctoral
Computer engineering	76	11	2
Industrial engineering	49	–	3
Electrical and communications engineering	45	–	5
Civil engineering	34	–	2
Chemical engineering	25	–	–
Other engineering	–	92	2
Engineering, general	–	1	–
The University of Alabama at Birmingham	166	183	14
Biomedical engineering	50	7	5
Mechanical engineering	42	18	1
Electrical and communications engineering	32	–	–
Civil engineering	24	21	–
Materials engineering	12	6	2
Engineering, general	6	92	–
Electrical and computer engineering	–	23	4
Other engineering	–	16	2
University of South Alabama	140	30	3
Mechanical engineering	53	6	–
Civil engineering	50	8	–
Chemical engineering	15	1	1
Electrical and communications engineering	14	9	–
Computer engineering	8	–	–
Systems engineering	–	6	2
Alabama A&M University	64	33	–
Mechanical engineering	37	3	–
Electrical and communications engineering	17	–	–
Civil engineering	10	–	–
Other engineering	–	30	–
Tuskegee University	50	7	–
Mechanical engineering	27	1	–
Aerospace engineering	8	–	–
Chemical engineering	8	1	–
Electrical and communications engineering	7	2	–
Materials engineering	–	3	–
Alabama State University	6	–	–
Biomedical engineering	6	–	–
Total	2,499	802	171

EPSCoR = Established Program to Stimulate Competitive Research

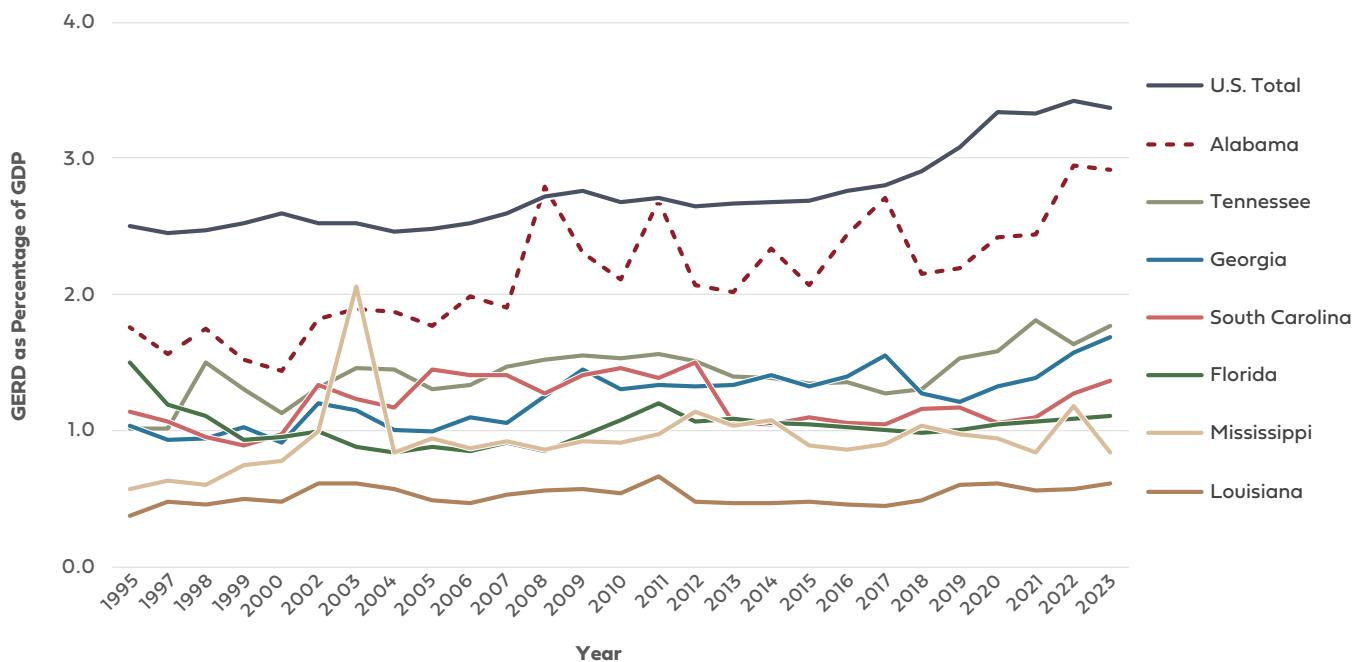
Notes: All certificates and degrees conferred are for the academic year, which runs from July 1 through June 30 of the following calendar year. In the table, 2024 data are for the academic year 2023–2024. A blank cell “–” indicates that no data were reported for that specific item or survey component by the institution. Reasons an institution may not report: a program may not have existed prior to 2024; there were no graduates/completions from a program in a given year; or the institution did not report to IPEDS in that year.

Source: National Center of Education Statistics (2025). Integrated Postsecondary Education Data System Completions Survey, multiple years.

Figure 15

Companies, universities, government, and nonprofit research organizations perform R&D. The higher the R&D intensity (defined as total R&D expenditures relative to GDP), the more technology-intensive an economy is. The average R&D intensity of an Organization for Economic Cooperation and Development (OECD) member country is 2.67%. U.S. R&D intensity is higher (3.37%). Alabama's R&D intensity was 2.92% in 2023, which is lower than the U.S. but higher than neighboring states: Tennessee (1.77%), Georgia (1.69%), South Carolina (1.37%), Florida (1.11%), Mississippi (0.84%), and Louisiana (0.61%).

Comparison of U.S., Alabama, and Select Neighboring States' R&D Intensity (Gross Expenditures on R&D as a Share of GDP), 1995–2023



GERD = Gross expenditures on R&D

Source: National Science Board (2025). State Science and Engineering Indicators.

Figure 16

Although Alabama has a high R&D intensity (2.92%) driven by the \$2.1 billion of federal R&D activity at the National Aeronautics and Space Administration (NASA) Marshall Space Flight Center and Redstone Arsenal, Alabama ranks 26th for total R&D expenditures. In 2023, the business sector drove nearly 60% of Alabama's \$9 billion in total R&D, followed by federal agencies (23%), academia (17%), and other sources (1%). By comparison, at the national level, business accounts for 78% of total U.S. R&D spending, academia 11%, federal 8%, and other sources 3%.

Total R&D Expenditures (\$BN) by Performing Sector in Alabama, Other Southeast States, and the U.S., 2023

State	R&D Rank	Total R&D	Federal	Business	Academic	Nonprofit	State	R&D Intensity (%)
U.S. total		\$937.24	\$74.81	\$727.51	\$103.33	\$30.82	\$0.78	3.37
North Carolina	11	\$24.34	\$0.43	\$18.47	\$4.35	\$0.23	\$0.02	3.06
Florida	13	\$18.01	\$1.16	\$12.63	\$3.52	\$0.64	\$0.05	1.11
Virginia	15	\$15.90	\$4.57	\$8.24	\$2.30	\$0.11	\$0.02	2.20
Georgia	17	\$14.09	\$0.26	\$10.05	\$3.66	\$0.12	\$0.00	1.69
Tennessee	25	\$9.38	\$2.48	\$4.18	\$1.97	\$0.75	*	1.77
Alabama	26	\$9.05	\$2.07	\$5.31	\$1.58	\$0.08	\$0.01	2.92
South Carolina	32	\$4.55	\$0.45	\$3.06	\$0.92	\$0.09	\$0.03	1.37
Kentucky	38	\$2.25	\$0.13	\$1.30	\$0.76	\$0.02	\$0.01	0.79
Louisiana	39	\$1.93	\$0.05	\$0.73	\$1.06	\$0.08	\$0.01	0.61
Mississippi	41	\$1.28	\$0.25	\$0.42	\$0.61	\$0.00	\$0.00	0.84
Arkansas	42	\$1.26	\$0.05	\$0.71	\$0.46	\$0.01	*	0.71
West Virginia	48	\$0.73	\$0.07	\$0.36	\$0.29	\$0.00	\$0.01	0.72

* = amount < \$0.5 million

Note: Federal R&D expenditures include R&D expenditures from federal agencies and federally funded research and development centers (FFRDCs).

Source: National Science Board (2025). State Science and Engineering Indicators.

Figure 17

Alabama ranks first out of the 28 National Science Foundation (NSF) Established Program to Stimulate Competitive Research (EPSCoR) states and territories in business R&D expenditures. In 2023, Alabama companies reported \$5.3 billion in business R&D expenditures, up from \$2.2 billion in 2018. Alabama business R&D's CAGR was 18.9% (2018–2023). By comparison, the average growth in business R&D expenditures across all EPSCoR states was 11.2% per year over the same 5-year period.

Total Business R&D Expenditures and CAGR in EPSCoR States, 2013, 2018, and 2023

State	Rank	Total Business R&D Expenditures (\$BN)			CAGR (%)	
	2023	2013	2018	2023	10-Year	5-Year
Alabama	1	\$1.563	\$2.236	\$5.306	13.0%	18.9%
Delaware	2	\$2.310	\$2.375	\$5.267	8.6%	17.3%
Iowa	3	\$2.052	\$3.315	\$4.461	8.1%	6.1%
New Hampshire	4	\$2.045	\$2.566	\$3.964	6.8%	9.1%
South Carolina	5	\$1.016	\$1.670	\$3.061	11.7%	12.9%
Kansas	6	\$1.942	\$2.593	\$2.860	3.9%	2.0%
Idaho	7	\$1.238	\$2.556	\$2.852	8.7%	2.2%
Oklahoma	8	\$0.505	\$0.868	\$2.562	17.6%	24.2%
Nevada	9	\$0.525	\$0.960	\$2.113	14.9%	17.1%
Nebraska	10	\$0.627	\$0.570	\$2.031	12.5%	28.9%
New Mexico	11	\$0.519	\$0.699	\$1.472	11.0%	16.1%
Kentucky	12	\$1.279	\$1.435	\$1.300	0.2%	-2.0%
Louisiana	13	\$0.354	\$0.415	\$0.726	7.4%	11.8%
Arkansas	14	\$0.288	\$0.471	\$0.707	9.4%	8.5%
Maine	15	\$0.365	\$0.285	\$0.670	6.3%	18.6%
North Dakota	16	\$0.229	\$0.312	\$0.638	10.8%	15.4%
Rhode Island	17	\$0.571	\$0.703	\$0.619	0.8%	-2.5%
Vermont	18	\$0.406	\$0.300	\$0.602	4.0%	14.9%
Hawaii	19	\$0.214	\$0.146	\$0.499	8.8%	27.9%
Montana	20	\$0.092	\$0.180	\$0.448	17.2%	20.0%
Mississippi	21	\$0.211	\$0.276	\$0.415	7.0%	8.5%
West Virginia	22	\$0.306	\$0.238	\$0.361	1.7%	8.7%
South Dakota	23	\$0.164	\$0.201	\$0.254	4.5%	4.8%
Alaska	24	\$0.046	\$0.025	\$0.072	4.6%	23.6%
Wyoming	25	\$0.028	\$0.039	\$0.068	9.3%	11.8%
Total EPSCoR		\$18.895	\$25,434	\$43.328	8.7%	11.2%

Note: These data do not include the U.S. territories Guam, U.S. Virgin Islands, and Puerto Rico.

Source: National Center for Science and Engineering Statistics (2025). Business Research and Development Survey, multiple years.

Figure 18

In 2023, Alabama's service and manufacturing industries performed \$1.8 billion and \$813 million of R&D, respectively. Information services accounted for 87% of non-manufacturing R&D expenditures. The transportation, computer and electronics products, and chemicals industries manufacturing R&D.

Total Business R&D Expenditures Paid for and Performed by the Company and CAGR by Select Industries, 2020–2023

Industry	Industry Code	Business R&D Expenditures (\$M)				
		2020	2021	2022	2023	4-Year Change
Service Industries	21–23, 42–81	\$470	\$450	\$1,170	\$1,772	\$1,302
Information	51	\$262	\$223	\$925	\$1,534	\$1,272
Data processing and hosting	518	\$115	\$73	D	D	N/A
Software	5112	\$78	\$85	\$91	\$191	\$113
Other information services	Other 51	\$66	0-66	D	D	N/A
Professional, scientific, and technical services	54	\$155	\$150	\$174	\$199	\$44
Computer systems design	5415	\$70	\$107	\$106	\$114	\$44
Manufacturing Industries	31–33	\$859	\$932	\$1,088	\$813	-\$46
Transportation equipment (aerospace, automotive, military)	336	\$350	\$301	\$396	\$323	-\$27
Computer and electronic products	334	\$138	\$138	\$152	\$158	\$20
Chemicals	325	\$148	\$191	\$244	\$148	\$0
Machinery	333	\$27	\$51	\$63	\$61	\$34
Paper	322	\$16	\$37	\$26	\$36	\$20
Miscellaneous	339	\$66	\$92	\$93	\$21	-\$45
Fabricated metal products	332	\$20	\$33	\$19	\$19	-\$1
Electrical equipment and components	335	\$28	\$9	\$20	\$18	-\$10
Plastics and rubber products	326	\$16	\$20	\$17	\$9	-\$7

N/A = Not applicable after D = Suppression

Note: Industries are illustrative and do not sum to the nonmanufacturing and manufacturing total rows.

Source: National Center for Science and Engineering Statistics (2025). Business Research and Development Survey, multiple years.

Figure 19

Funding for academic R&D come from a variety of sources: federal, state, institutional, industry, and nonprofit organizations. Sustained periods of high annual growth in academic R&D expenditures drive a state’s academic R&D ranking. In 2024, Alabama ranked first of 28 EPSCoR states and territories for academic R&D expenditures with \$1.759 billion. Its past 10- and 5-year growth rates exceeded the EPSCoR average growth rate.

Total Academic R&D Expenditures and CAGR in EPSCoR States and Territories, 2014, 2019, and 2024

State	Rank	Total R&D Expenditures (\$BN)			CAGR (%)	
	2024	2014	2019	2024	10-Year	5-Year
Alabama	1	\$0.813	\$1.124	\$1.759	8.0%	9.4%
Kansas	2	\$0.548	\$0.704	\$1.206	8.2%	11.4%
Iowa	3	\$0.774	\$0.880	\$1.183	4.3%	6.1%
Louisiana	4	\$0.666	\$0.778	\$1.169	5.8%	8.5%
South Carolina	5	\$0.656	\$0.743	\$0.990	4.2%	5.9%
Oklahoma	6	\$0.420	\$0.534	\$0.795	6.6%	8.3%
Kentucky	7	\$0.534	\$0.615	\$0.788	4.0%	5.1%
Nebraska	8	\$0.455	\$0.573	\$0.726	4.8%	4.9%
Mississippi	9	\$0.410	\$0.536	\$0.669	5.0%	4.5%
New Hampshire	10	\$0.365	\$0.473	\$0.650	5.9%	6.6%
New Mexico	11	\$0.412	\$0.366	\$0.582	3.5%	9.7%
Rhode Island	12	\$0.447	\$0.393	\$0.533	1.8%	6.3%
Delaware	13	\$0.193	\$0.229	\$0.510	10.2%	17.3%
Arkansas	14	\$0.286	\$0.365	\$0.490	5.5%	6.1%
Montana	15	\$0.181	\$0.274	\$0.425	8.9%	9.2%
Hawaii	16	\$0.335	\$0.301	\$0.404	1.9%	6.0%
North Dakota	17	\$0.222	\$0.263	\$0.399	6.0%	8.7%
Nevada	18	\$0.154	\$0.283	\$0.353	8.7%	4.5%
West Virginia	19	\$0.196	\$0.213	\$0.306	4.6%	7.5%
Alaska	20	\$0.174	\$0.169	\$0.276	4.7%	10.2%
Vermont	21	\$0.114	\$0.139	\$0.252	8.2%	12.7%
Maine	22	\$0.125	\$0.151	\$0.224	6.0%	8.1%
Idaho	23	\$0.143	\$0.168	\$0.216	4.2%	5.1%
Wyoming	24	\$0.051	\$0.080	\$0.167	12.5%	15.8%
South Dakota	25	\$0.105	\$0.118	\$0.142	3.1%	3.8%
Puerto Rico	26	\$0.123	\$0.121	\$0.140	0.7%	1.7%
Guam	27	\$0.007	\$0.012	\$0.025	13.6%	15.6%
Virgin Islands	28	\$0.20	\$0.012	\$0.015	-3.2%	3.8%
Total EPSCoR		\$8.930	\$10.617	\$15.384	5.6%	3.8%

Note: The EPSCoR program supports states and territories that received 0.75% or less of total NSF research funding over the most recent 3-year period. The data presented for each state and territory include all public, private, and Tribal colleges that responded to the Higher Education R&D Survey.

Source: National Center for Science and Engineering Statistics (2025). Higher Education R&D Survey, multiple years.

Figure 20

Alabama’s total academic R&D expenditures were \$1.8 billion in 2024. The University of Alabama at Birmingham accounted for 49% of this total, followed by Auburn University (22%), The University of Alabama (13%), and The University of Alabama in Huntsville (9%).

Alabama Academic R&D Expenditures (\$M) by Institution, 2014, 2019–2024, and 10- and 5-Year CAGRs

Institution	Total R&D Expenditures (\$M)							CAGR (%)	
	2014	2019	2020	2021	2022	2023	2024	10-Year	5-Year
The University of Alabama at Birmingham	\$428.6	\$607.9	\$618.2	\$644.3	\$713.5	\$780.5	\$865.9	7.3%	7.3%
Auburn University	\$142.5	\$231.6	\$255.3	\$266.4	\$304.4	\$349.3	\$393.6	10.7%	11.2%
The University of Alabama	\$53.1	\$83.3	\$95.2	\$129.5	\$163.2	\$184.9	\$221.2	15.3%	21.6%
The University of Alabama in Huntsville	\$89.3	\$109.7	\$131.6	\$149.8	\$169.5	\$163.4	\$154.5	5.6%	7.1%
University of South Alabama	\$41.7	\$52.5	\$51.1	\$47.6	\$43.5	\$53.2	\$70.1	5.3%	5.9%
Tuskegee University	\$24.9	\$20.6	\$21.0	\$21.4	\$21.9	\$25.6	\$29.7	1.8%	7.6%
Alabama A&M University	\$29.5	\$12.8	\$8.7	\$9.2	\$9.6	\$15.6	\$16.2	-5.8%	4.8%
Alabama State University	\$2.2	\$2.6	\$2.6	\$2.6	\$3.2	\$3.2	\$3.9	5.7%	8.6%
Troy University	–	–	\$1.7	\$1.5	\$2.5	\$3.8	\$3.3	N/A	N/A
Auburn University at Montgomery	–	–	–	–	–	–	\$0.8	N/A	N/A
Jacksonville State University	–	\$2.4	\$1.2	\$0.3	–	–	–	N/A	N/A
Total	\$812.8	\$1,123.5	\$1,186.7	\$1,272.6	\$1,431.4	\$1,579.5	\$1,759.2	8.0%	9.4%

Note: 2014–2024 data are for those Alabama institutions that completed the long-form Higher Education R&D Survey that gathers this level of detail. A blank cell “–” indicates data were not available.

Source: National Center for Science and Engineering Statistics (2025). Higher Education R&D Survey, multiple years.

Figure 21

Federally supported academic R&D (\$955 million) drove total R&D growth at Alabama higher education institutions from 2019 to 2024. In 2024, the federal government supported 54% of Alabama’s total academic R&D expenditures. Institutional funds (\$568 million) accounted for 32% of total academic R&D, with a 5-year CAGR of 13.0%. Business/industry is a small funder of academic R&D (\$85.7 million) accounting for 5% of the total. The remainder of academic R&D funds (\$150.6 million, or 9%) came from state and local government, nonprofit organizations, and other sources.

Alabama Academic R&D Expenditures (\$M) by Source, 2014, 2019–2024, and 10- and 5-Year CAGRs

Field	Total R&D Expenditures (\$M)							CAGR (%)	
	2014	2019	2020	2021	2022	2023	2024	10-Year	5-Year
Federal government	\$485.3	\$633.8	\$668.9	\$736.0	\$779.3	\$852.7	\$955.0	7.0%	8.5%
Institutional funds	\$214.3	\$308.3	\$329.3	\$351.2	\$437.5	\$476.4	\$567.9	10.2%	13.0%
Business/industry	\$37.6	\$71.4	\$70.6	\$77.1	\$87.1	\$90.4	\$85.7	8.6%	3.7%
State and local government	\$42.6	\$60.9	\$64.7	\$61.2	\$68.8	\$76.1	\$81.6	6.7%	6.0%
Nonprofit organizations	\$21.2	\$34.8	\$36.8	\$35.6	\$40.6	\$46.8	\$51.8	9.3%	8.3%
All other sources	\$11.8	\$14.4	\$16.4	\$11.5	\$18.1	\$37.1	\$17.2	3.9%	3.6%
Total	\$812.8	\$1,123.5	\$1,186.7	\$1,272.6	\$1,431.4	\$1,579.5	\$1,759.2	8.0%	9.4%

Note: 2014–2024 data are for those Alabama institutions that completed the long-form Higher Education R&D Survey that gathered this level of detail.

Source: National Center for Science and Engineering Statistics (2025). Higher Education R&D Survey, multiple years.

Figure 22

In 2024, the top federal funders of academic R&D in Alabama were the U.S. Department of Health and Human Services (\$518.5 million), followed by the Department of War (\$129.8 million), other federal agencies (\$99.3 million), NSF (\$76 million), U.S. Department of Agriculture (\$57.1 million), and NASA (\$50.1 million) were the top federal funders of academic R&D in Alabama.

Federally Supported Academic R&D Expenditures (\$M) in Alabama by Agency, 2024

	HHS	DOW	Other federal	NSF	USDA	NASA	DOE	Total
The University of Alabama at Birmingham	\$450.5	\$19.6	\$11.1	\$8.7	\$0.3	\$4.3	\$3.6	\$498.1
Auburn University	\$23.0	\$27.9	\$26.6	\$19.8	\$44.4	\$5.9	\$10.4	\$158.0
The University of Alabama in Huntsville	\$1.0	\$60.7	\$5.1	\$10.3	\$0.2	\$37.0	\$1.2	\$115.4
The University of Alabama	\$22.3	\$11.9	\$44.9	\$22.3	\$1.7	\$1.6	\$7.4	\$112.2
University of South Alabama	\$9.5	\$5.9	\$8.2	\$6.2	\$2.0	\$0.4	\$0.2	\$32.4
Tuskegee University	\$4.9	\$1.7	–	\$4.5	\$7.9	\$0.3	\$0.6	\$19.9
Alabama A&M University	\$6.5	\$2.1	\$1.0	\$1.6	\$0.6	\$0.2	\$0.7	\$12.7
Alabama State University	\$0.7	–	–	\$2.4	–	\$0.3	–	\$3.4
Troy University	–	\$0.1	\$2.3	\$0.0	\$0.1	–	–	\$2.4
Auburn University at Montgomery	\$0.2	–	–	\$0.2	–	\$0.1	–	\$0.4
Total	\$518.5	\$129.8	\$99.3	\$76.0	\$57.1	\$50.1	\$24.1	\$955.0

DOW = Department of War; DOE = Department of Energy; HHS = Department of Health and Human Services; USDA = U.S. Department of Agriculture

Notes: A blank cell “–” indicates an institution did not report data.

Source: National Center for Science and Engineering Statistics (2025). Higher Education R&D Survey, multiple years.

Figure 23

Across S&E fields, the life sciences received the most R&D funding in 2024, totaling \$1.1 billion, followed by engineering (\$288 million), geosciences (\$81 million), computer and information sciences (\$72 million), and the physical sciences (\$68 million). While R&D in most S&E fields grew between 2019 and 2024, geosciences had the fastest 5-year CAGR, at 26.8%. Exceptions to this 5-year growth trend were other life sciences (-12.6% per year), metallurgical and materials engineering (-10.1% per year), and social sciences (-0.5% per year).

Alabama Total Academic R&D Expenditures (\$M) and CAGR by S&E Field, FY 2014, 2019-2024, 10- and 5-Year CAGR

Field	Total R&D Expenditures (\$M)							CAGR (%)	
	2014	2019	2020	2021	2022	2023	2024	10-Year	5-Year
Life sciences	\$541.5	\$709.0	\$717.5	\$747.7	\$856.1	\$952.1	\$1,056.7	6.9%	8.3%
Health sciences	\$314.6	\$448.1	\$448.7	\$491.7	\$539.2	\$593.7	\$673.7	7.9%	8.5%
Biological and biomedical sciences	\$133.2	\$162.8	\$159.7	\$160.0	\$203.1	\$245.0	\$254.6	6.7%	9.4%
Agricultural sciences	\$64.7	\$60.8	\$78.9	\$76.6	\$94.2	\$94.2	\$106.0	5.1%	11.8%
Other life sciences	\$29.0	\$35.8	\$28.8	\$18.2	\$17.4	\$16.7	\$18.2	-4.6%	-12.6%
Natural resources and conservation	–	\$1.5	\$1.4	\$1.2	\$2.2	\$2.6	\$4.1	N/A	22.5%
Engineering	\$136.7	\$190.0	\$219.5	\$237.8	\$239.3	\$256.6	\$287.6	7.7%	8.6%
Civil	\$14.4	\$18.8	\$24.1	\$29.7	\$38.5	\$42.6	\$57.3	14.8%	25.0%
Aerospace	\$42.6	\$36.6	\$44.0	\$48.2	\$44.0	\$49.0	\$44.8	0.5%	4.2%
Electrical and communications	\$14.0	\$33.8	\$32.6	\$34.5	\$33.6	\$32.6	\$43.5	12.0%	5.2%
Mechanical	\$16.2	\$27.5	\$39.0	\$46.7	\$38.8	\$38.7	\$43.2	10.3%	9.5%
Chemical	\$10.5	\$15.3	\$16.6	\$18.7	\$19.9	\$19.0	\$24.9	9.0%	10.3%
Other	\$19.1	\$17.4	\$19.8	\$15.5	\$20.5	\$28.8	\$23.4	2.1%	6.1%
Industrial and manufacturing	–	\$8.2	\$7.9	\$10.8	\$16.1	\$17.7	\$20.1	N/A	19.6%
Biomedical engineering	\$8.2	\$8.4	\$8.5	\$7.6	\$9.9	\$17.3	\$16.1	7.0%	13.9%

Field	Total R&D Expenditures (\$M)							CAGR (%)	
	2014	2019	2020	2021	2022	2023	2024	10-Year	5-Year
Metallurgical and materials	\$11.7	\$24.1	\$26.9	\$26.2	\$18.1	\$10.8	\$14.2	1.9%	-10.1%
Non-S&E fields	\$27.9	\$68.1	\$76.1	\$84.5	\$104.4	\$111.2	\$128.4	16.5%	13.5%
Geosciences, Atmospheric Sciences, and Ocean Sciences	\$19.2	\$24.8	\$29.6	\$31.2	\$38.8	\$58.8	\$81.3	15.5%	26.8%
Geological and earth sciences	\$3.4	\$3.2	\$6.3	\$5.7	\$7.3	\$20.8	\$40.3	28.0%	65.8%
Atmospheric science and meteorology	\$11.3	\$16.5	\$17.2	\$18.0	\$21.5	\$22.2	\$24.8	8.1%	8.4%
Ocean sciences and marine sciences	\$2.4	\$4.2	\$5.1	\$5.7	\$8.5	\$14.4	\$13.1	18.5%	25.4%
Other geosciences	\$2.1	\$0.8	\$0.9	\$1.8	\$1.5	\$1.4	\$3.1	4.2%	30.9%
Computer and Information Sciences	\$37.1	\$51.1	\$60.5	\$72.8	\$86.2	\$76.5	\$72.4	6.9%	7.2%
Physical Sciences	\$27.0	\$39.5	\$42.3	\$50.7	\$53.8	\$62.4	\$68.2	9.7%	11.5%
Physics	\$12.9	\$13.8	\$16.0	\$18.2	\$18.2	\$20.2	\$25.4	7.1%	13.0%
Chemistry	\$9.1	\$14.4	\$13.3	\$13.9	\$15.4	\$20.7	\$22.9	9.7%	9.6%
Astronomy and astrophysics	\$4.6	\$9.8	\$10.2	\$11.8	\$14.5	\$16.5	\$15.4	12.9%	9.4%
Materials science	–	\$1.4	\$2.4	\$6.7	\$5.5	\$4.9	\$4.4	N/A	25.9%
Other physical sciences	\$0.4	\$0.1	\$0.2	\$0.2	\$0.2	\$0.1	\$0.1	-11.7%	13.9%
Psychology	\$7.1	\$11.0	\$11.7	\$15.2	\$21.8	\$26.0	\$25.3	13.5%	18.1%
Social Sciences	\$11.3	\$19.7	\$19.3	\$23.5	\$19.4	\$21.8	\$19.2	5.5%	-0.5%
Mathematics and Statistics	\$2.1	\$6.8	\$7.0	\$7.1	\$8.4	\$9.6	\$10.9	18.1%	10.1%
Other Sciences	\$3.0	\$3.5	\$3.2	\$2.1	\$3.1	\$4.6	\$9.1	11.9%	21.0%
Total	\$812.8	\$1,123.5	\$1,186.7	\$1,272.6	\$1,431.4	\$1,579.5	\$1,759.2	8.0%	9.4%

Note: 2014–2024 data are for those Alabama institutions that completed the long-form Higher Education R&D Survey that gathered this level of detail. A blank cell “—” indicates data were not available.

Source: National Center for Science and Engineering Statistics (2025). Higher Education R&D Survey, multiple years.

Figure 24

In 2024, The University of Alabama at Birmingham performed the most industry-sponsored R&D (\$71.1 million) driven by clinical trials. In 2024, Auburn University ranked second with \$10.8 million in industry-sponsored R&D, followed by The University of Alabama (\$1.8 million), The University of Alabama at Huntsville (\$0.9 million), the University of South Alabama (\$0.7 million), and Alabama A&M University (\$0.4 million). The U.S. average for industry-sponsored R&D among institutions with \$100 million or more in total R&D expenditures was \$34.2 million. The U.S. average for emerging research institutions—that is, those with less than \$100 million in R&D—was \$0.7 million. Industry-sponsored R&D as a percentage of total academic R&D expenditures is also shown.

Industry-Sponsored R&D as a Percentage of Total R&D Expenditures: U.S. and Alabama Research Institutions That Performed R&D, 2022–2024

Institution	Industry-Sponsored Share of Total R&D Expenditures (%)			R&D Expenditures (\$M)	
	2022	2023	2024	Industry-Sponsored R&D 2024	Total Academic R&D 2024
The University of Alabama at Birmingham	10.3%	9.5%	8.2%	\$71.1	\$865.9
Auburn University	2.7%	3.3%	2.7%	\$10.8	\$393.6
The University of Alabama	1.7%	1.1%	0.8%	\$1.8	\$221.2
The University of Alabama in Huntsville	0.4%	0.4%	0.6%	\$0.9	\$154.5
U.S. Average for Institutions with \$100M+ in R&D	6.0%	5.9%	5.6%	\$34.2	\$612.1
University of South Alabama	2.8%	2.4%	1.0%	\$0.7	\$70.1
Alabama A&M University	4.0%	2.4%	2.4%	\$0.4	\$16.2
Troy University	1.5%	0.0%	0.3%	\$0.0	\$3.3
U.S. Average for Emerging Research Institutions	3.3%	3.0%	3.2%	\$0.7	\$23.5

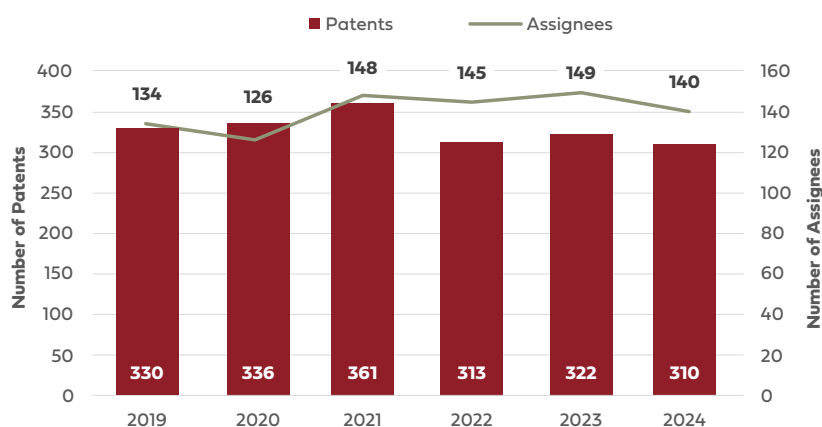
Note: 2014–2024 data are for those Alabama institutions that completed the long-form Higher Education R&D Survey that gathered this level of detail. Institutions that reported low industry-sponsored R&D expenditures may be rounded down to 0%. U.S. average industry-sponsored R&D expenditures were calculated based upon 178 universities with over \$100 million in R&D and 524 emerging research institutions with \$1 million to \$100 million in R&D in FY2024.

Source: National Center for Science and Engineering Statistics (2025). Higher Education R&D Survey, multiple years.

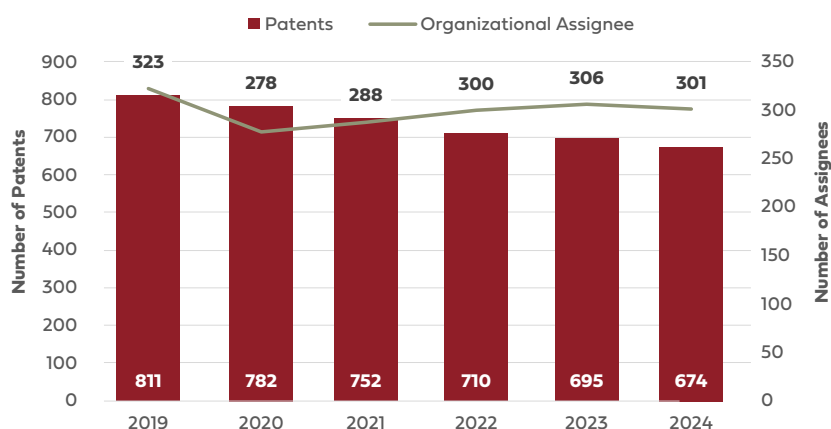
Figure 25

Companies, organizations, and individuals patent inventions that may have commercial value. Patent data for Alabama can be analyzed in two ways. One way is to analyze patent assignees—companies or organizations headquartered in Alabama that are named on patents. The number of assignees and their patenting activity is an indicator of a state’s capacity to fund R&D that generates new patents. The second is to analyze the patents of companies with at least one inventor that has an Alabama address. Inventor patenting activity is an indicator of the concentration of scientists and engineers engaged in R&D, even if the parent organization, e.g., NASA or Blue Origin, is headquartered outside the state.

Total Number of Alabama Companies, Universities, and Institutions and Total Number of Patents Granted, 2019–2024



Total Number of Companies, Universities, and Institutions with an Alabama-Based Inventor and Total Number of Patents Granted 2019–2024



Source: U.S. Patents and Trademark Organization (2026). PatentsView, multiple years. Accessed April 2026.

Figure 26

Critical technologies are those identified as key to U.S. economic competitiveness and national security. In Alabama, high-performance computing, disaster mitigation, biotechnology, and advanced energy and industrial efficiency technologies are the top critical technology patent categories. Together, these four categories accounted for 62% (270 patents) of Alabama’s 438 total critical technology patents in 2024. Biotechnology patents and robotics and automation patents have grown since 2022.

Critical Technology Patents Granted to an Organization or Inventor in Alabama, 2022–2025 Q3

Critical Technologies	2022	2023	2024	2025 Q3
High-performance computing, semiconductors, and advanced computer hardware and software	106	111	95	61
Natural and anthropogenic disaster prevention or mitigation	84	71	55	42
Biotechnology, medical technology, genomics, and synthetic biology	69	67	73	32
Advanced energy and industrial efficiency technologies	61	40	47	35
Advanced communications and immersive technologies	48	36	48	27
Artificial intelligence, machine learning, autonomy	50	41	46	32
Data storage, data management, cybersecurity, biometrics	38	39	27	20
Advanced materials science, including composite 2D materials, other next-generation materials	34	29	19	10
Robotics, automation, and advanced manufacturing	19	18	26	24
Quantum information science and technology	2	4	2	–
Alabama Total Critical Technology Patents	511	456	438	283
National Critical Technology Patents	133,553	142,180	130,792	92,849

Note: A single patent may be included in more than one cooperative patent classification code, reflecting dual applications across critical technology areas. Consequently, the sum of patents awarded by category is greater than the total number of patents awarded. A blank cell “–” indicates no data were reported.

Source: U.S. Patents and Trademark Organization (2026). PatentsView, multiple years. Accessed April 2026.

Figure 27

The top 50 patenting organizations in Alabama, based on total patents awarded from 2022 through Q3 of 2025, include out-of-state companies with an Alabama manufacturing facility (e.g., Boeing, Rheem, BlueHalo), companies headquartered in Alabama (e.g., Altec Industries, Progress Rail Services, Alabama Metal Industries), and five Alabama universities. The top 50 inventors in the state are U.S. federal research agencies and contractors.

Top 50 Companies, Universities, Federal Agencies, and Nonprofit Research Institutions by Number of Alabama Patents Granted, 2022–2025 Q3

	Assignee of Inventor	2022	2023	2024	2025 Q3
1	The Boeing Company	48	30	24	20
2	Rheem Manufacturing Company	27	27	16	13
3	The University of Alabama*	22	20	17	10
4	The University of Alabama at Birmingham*	13	17	13	17
5	The University of Alabama in Huntsville*	11	16	16	10
6	Auburn University*	12	15	20	5
7	Altec Industries, Inc.*	11	10	10	18
8	The Heil Co.	9	10	10	17
9	BlueHalo, LLC	1	15	18	10
10	CSP Technologies, Inc.	14	14	7	6
11	Hubbell Incorporated	8	7	7	8
12	Blue Origin Manufacturing, LLC	–	–	1	25
13	Progress Rail Services Corporation*	7	6	7	4
14	Southern Research Institute*	9	6	7	2
15	NASA	6	8	7	1
16	SIO2 Medical Products, LLC*	9	6	4	3
17	Alabama Metal Industries Corporation*	6	5	7	4
18	U.S. Army	5	4	5	6
19	Adtran, Inc.*	4	5	5	6
20	BioCryst Pharmaceuticals, Inc.	3	9	7	1
21	Nektar Therapeutics	6	7	3	2
22	EnhancedGEO Holdings, LLC	–	2	6	9
23	Raytheon Company	7	4	4	1
24	Playcore Wisconsin, Inc.	3	2	5	6
25	Neptune Technology Group LLC*	6	3	6	1
26	Harman International Industries	5	7	3	1
27	Perceptive Sensor Technologies, Inc.	4	6	4	1
28	NVIDIA Corporation	4	6	3	2
29	AT&T	6	4	4	1
30	RTX Corporation	–	1	7	6

	Assignee of Inventor	2022	2023	2024	2025 Q3
31	Performance Drone Works LLC	9	1	1	3
32	Pillar Vision, Inc.	3	2	5	4
33	Intergraph Corporation*	2	4	5	3
34	Southwire Company, LLC	5	5	2	1
35	McWane, Inc.*	–	4	6	2
36	Tuskegee University*	6	4	2	–
37	AFL Telecommunications LLC	5	4	1	2
38	Henkel AG & Co. KGaA	–	–	6	6
39	Dana Heavy Vehicle Systems Groups, LLC	3	3	6	–
40	Orbital Research Inc.	4	2	2	3
41	University of South Alabama*	3	3	4	1
42	Curiteva, Inc.*	5	1	1	4
43	CFD Research Corporation*	3	4	1	3
44	State Farm Insurance Company	–	3	5	2
45	Fishing Chaos, Inc.*	4	4	2	–
46	Kimber IP, LLC*	2	1	2	5
47	VERTIV IT Systems, Inc.	2	1	5	1
48	Trilinear BioVentures, LLC	1	4	3	1
49	Synapse Wireless, Inc.*	4	4	–	1
50	Science Applications International Corp	2	3	3	1

* Has a corporate headquarters in Alabama or is an Alabama academic and research institution.

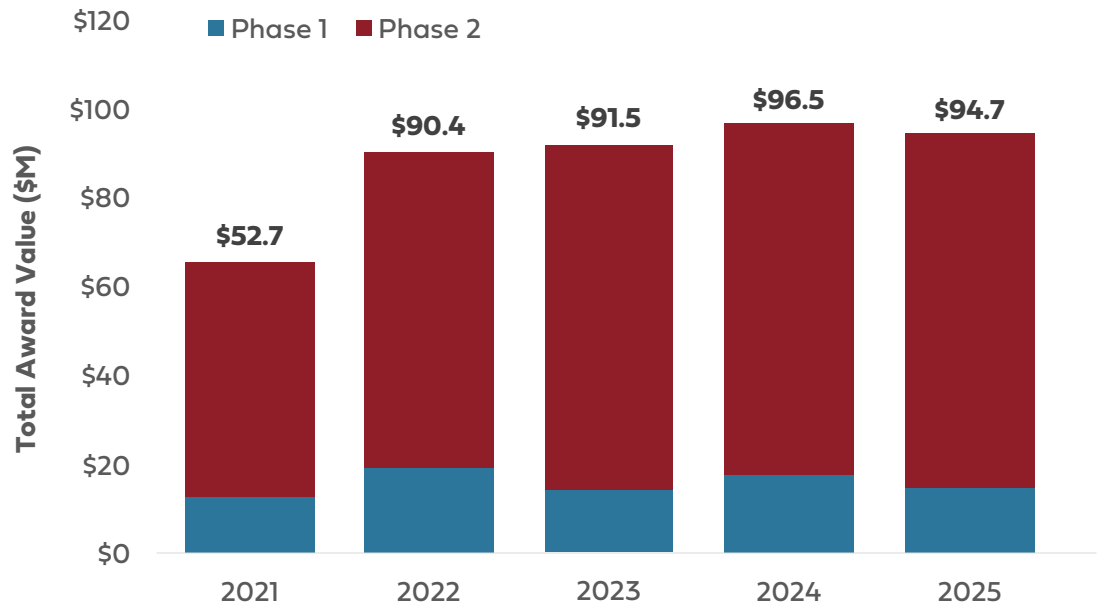
Note: A single patent may have more than one assignee. Consequently, the sum of patents awarded by category is greater than the total number of patents awarded. A blank cell “–” indicates no data were reported.

Source: U.S. Patents and Trademark Organization (2026). PatentsView, multiple years. Accessed April 2026.

Figure 28

Alabama Small Business Innovation Research and Small Business Technology Transfer (SBIR/STTR) awards increased from \$52.7 million in 2021 to \$94.7 million in 2025. The average size of Phase 2 awards was \$1.5 million, while the average size of Phase 1 awards was \$200,000 in 2025. The count of Phase 1 awards has remained relatively stable with a 3-year average of 85 awards in 2019-2021 and 2023-2025. Notably, the 3-year average of Alabama’s Phase 2 awards grew from 41 in 2019-2021 to 57 in 2023-2025.

Alabama SBIR/STTR Total Award Value by Phase, 2021-2025



Source: U.S. Small Business Administration (2026). SBIR/STTR Award Database. Accessed May 2026.

Alabama SBIR/STTR Counts by Phase and 3-Year Rolling Averages, 2016-2025

Phase	Year										3-Year Rolling Averages		
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2019-2021	2021-2023	2023-2025
Phase 1	68	80	55	87	89	79	108	87	91	76	85	91	85
Phase 2	32	56	49	33	46	43	55	60	57	54	41	53	57
Total	100	136	104	120	135	122	163	147	148	130	126	144	142

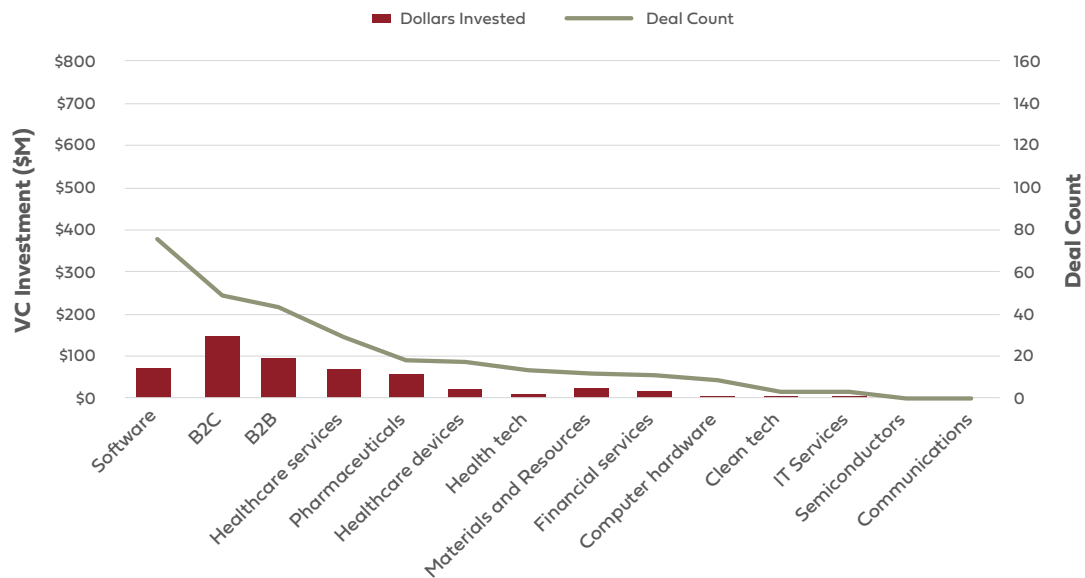
Note: Rolling averages are applied to select multiyear periods to maintain visual clarity and emphasize long-term trends rather than highlighting specific data points.

Source: U.S. Small Business Administration (2026). SBIR/STTR Award Database. Accessed May 2026.

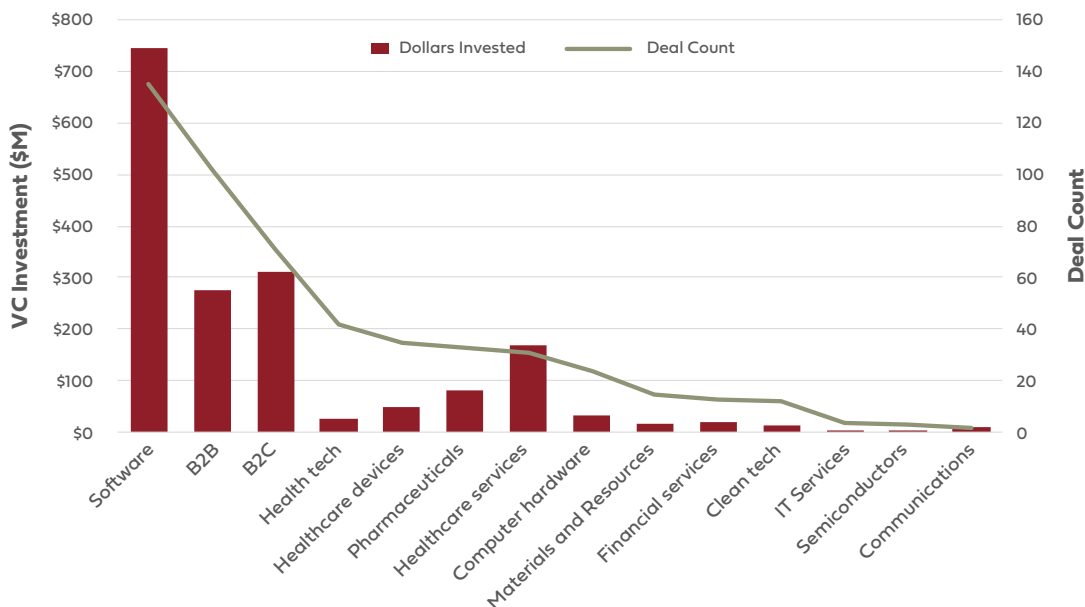
Figure 29

Between the two most recent 5-year periods, Alabama venture capital (VC) investment increased. VC investment grew from \$521.7 million invested in 283 deals in Alabama startup companies from 2016 to 2020 to \$1.753 billion invested in 522 deals from 2021 to 2025. Undisclosed deal values were a problem in both periods, and true VC investment is likely to be much higher.

Count of Alabama’s VC Deals and VC Investment (\$M) by Industry, 2016–2020



Count of Alabama’s VC Deals and VC Investment (\$M) by Industry, 2021–2025



B2B = Business-to-business; B2C = Business-to-consumer

Note: From 2016 to 2020, there were 63 deals whose value was undisclosed. From 2021 to 2025, there were 205 deals whose value was undisclosed.

Source: PitchBook (2026). Venture Capital and Private Equity Database. Accessed April 2026.

Figure 30

Over the most recent 5-year period (2021–2025), the leading sectors in Alabama, by VC deal count were software, business-to-business (B2B) services, business-to-consumer (B2C) services, and health tech. The leading sectors by dollar value of VC investment were software, B2C, B2B, and health care services.

Alabama VC Deals and VC Investment (\$M) by Industry, 2021–2025

Primary Industry	Deal Count	Investment (\$M)	Average (\$M)	Minimum (\$M)	Maximum (\$M)
Software	135	\$744.9	\$9.3	\$0.01	\$454.0
B2B	102	\$274.7	\$4.2	\$0.01	\$48.5
B2C	71	\$311.0	\$8.2	\$0.01	\$165.0
Health tech	42	\$27.6	\$1.3	\$0.01	\$7.0
Health care devices	35	\$50.7	\$2.5	\$0.03	\$21.6
Pharmaceuticals	33	\$80.4	\$3.8	\$0.1	\$20.0
Health care services	31	\$168.3	\$6.7	\$0.01	\$133.2
Computer hardware	24	\$32.1	\$2.5	\$0.1	\$6.3
Materials and resources	15	\$18.8	\$1.9	\$0.02	\$9.0
Financial services	13	\$22.0	\$2.4	\$0.1	\$9.9
Clean tech	12	\$12.8	\$1.8	\$0.02	\$4.7
IT services	4	\$0.1	\$0.1	\$0.04	\$0.1
Semiconductors	3	\$0.1	\$0.1	\$0.1	\$0.1
Communications	2	\$10.0	\$5.0	\$4.1	\$5.9
Total	522	\$1,753.3	\$49.8	\$4.6	\$885.3

Notes: From 2021 to 2025, there were 205 deals whose value was undisclosed.
Source: PitchBook (2026). Venture Capital and Private Equity Database. Accessed April 2026.

Figure 31

Impact Area	Indicators	Now 2024	Future 2030*	Growth Rate
Research Competitiveness	Business R&D expenditures**	\$5.3 BN	\$10.9 BN	10.8%
	Academic R&D expenditures	\$1.8 BN	\$2.3 BN	4.7%
	Industry-sponsored R&D expenditures	\$85.7 M	\$95.7 M	1.9%
STEM Workforce	Employment in science and engineering (S&E) jobs	130,820	147,194	2.0%
	Employment in S&E-related (mainly health care) jobs	156,410	171,842	1.6%
	Employment in skilled technical jobs	410,730	416,801	0.2%
STEM Degrees				
S&E-Related (non-Health)†	Certificates	7,022	8,045	2.3%
	Associate degrees	1,438	1,477	0.4%
	Bachelor's degrees	401	697	9.6%
	Master's degrees	44	107	16.0%
	Doctoral degrees	3	3	N/A
S&E	Certificates	914	1,512	8.8%
	Associate degrees	318	354	1.8%
	Bachelor's degrees	10,379	10,474	0.2%
	Master's degrees	3,264	4,245	4.5%
	Doctoral degrees	749	827	1.7%
Health Sciences	Certificates	3,585	3,443	-0.7%
	Associate degrees	2,960	2,948	-0.1%
	Bachelor's degrees	4,505	4,778	1.0%
	Master's degrees	3,073	3,222	0.8%
	Doctoral degrees	1,763	2,042	2.5%
R&D-Intensive Companies	Employment in R&D-intensive manufacturing	88,156	93,568	1.0%
	Employment in R&D-intensive services	44,508	48,825	1.6%
	Number of Alabama patenting entities	301	291	-0.7%
	Patents awarded	674	615	-1.8%
Technology Commercialization	Number of SBIR/STTR awards**	130	128	-0.4%
	Value of SBIR/STTR awards**	\$94.7 M	\$119.0 M	4.7%
	5-year count of VC deals**	522	716	6.5%
	5-year value of VC investment**	\$1.8 BN	\$3.3 BN	13.7%

* RTI projected Alabama's 2030 performance on impact metrics by halving its 2019-2024 (or latest available years) compound annual growth rate. See the appendix for growth rates.

** The most recent available data for business R&D expenditures are from 2023; the most recent available data for SBIR/STTR and VC are from 2025. Due to cyclical volatility, RTI analyzed and compared 5-year totals for VC: 2016-2020 and 2021-2025.

† S&E-related (non-health) programs span a wide range of fields, from technical certificates like welding and manufacturing technician to bachelor's and graduate-level degrees in areas including aviation management, homeland security, and math and science education. See the appendix for a complete list.

