

A photograph of three young women in a library setting. They are gathered around a wooden table, looking at a laptop. One woman is pointing at the screen, while the others look on with interest. Bookshelves filled with books are visible in the background.

Computer Science Education & Workforce Development

Ryan Harkins
Director of Public Policy
Microsoft Corporation



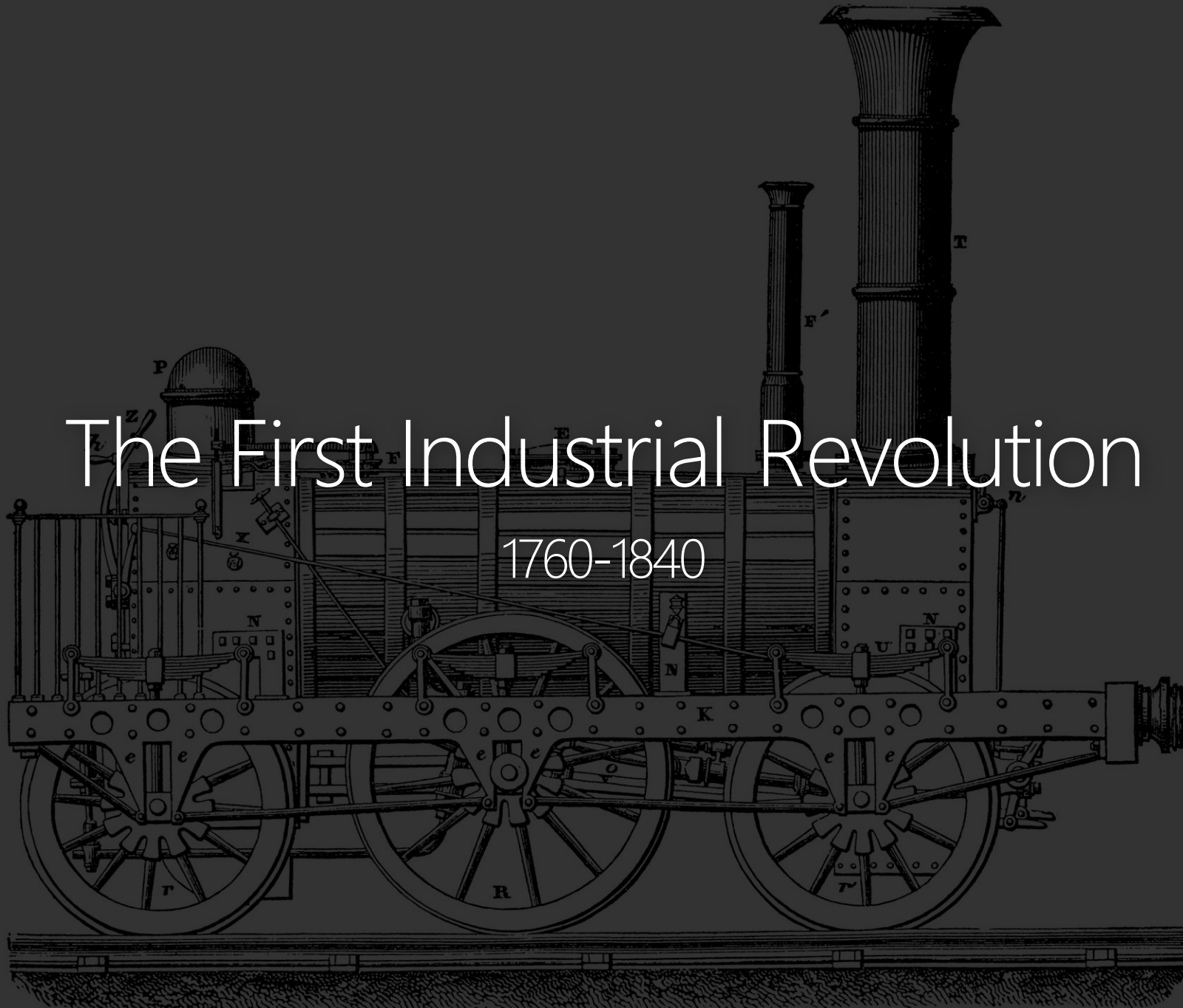
Our Mission

A young girl with dark hair, wearing a purple sweater, is smiling and holding a green pencil behind her ear. She is holding a piece of paper with a blue line drawing of a face. The background is a blurred classroom setting with yellow shelves and a green chalkboard.

Empower every student
on the planet to achieve more.

The First Industrial Revolution

1760-1840







The Second Industrial Revolution

1870 - 1940





A black and white photograph of a man in a suit operating a large, early computer system. The man is seated at a console with a grid of buttons and switches, his hands resting on the controls. Behind him, a large cabinet houses several tape drives, each with a circular tape reel visible. Another man in a suit stands in the background, interacting with one of the tape drives. The scene is set in a room with large windows, suggesting a mid-20th-century office or laboratory environment.

The Third Industrial Revolution

1960 - 2015



WATERVIEW COMPLEX II
1234 Lake Washington Blvd.
Seattle, WA 98117

Dear Mr. Grant,

Since you began occupying Apartment 125, we've never had any complaints from the building manager or your surrounding neighbors. First we'd like to say how pleasant it's been having you as a tenant at Lakeside Complex II. Your lease payments have always been prompt, and the exemplary condition of the apartment at the annual inspection last November inspired us to refund your damage deposit in full.

At that time we noted your possession of a small green reptile, which, as you explained, was not an ordinary housepet and therefore was not subject to the lease agreement you signed to obtain the apartment two years ago.

We agreed to make an exception, partly because of your reputation as a good tenant, and partly because of your testimony about the animal's harmless nature.

COMMAND: [F1] Copy [F2] Delete [F3] Format [F4] Gallery [F5] Help [F6] Insert [F7] Jump [F8] Library
[F9] Options [F10] Print [F11] Quit [F12] Replace [F13] Search [F14] Transfer [F15] Undo [F16] Window
Select option or type command letter.

Page 1

? 99% Free Microsoft Word: LETTER.DOC



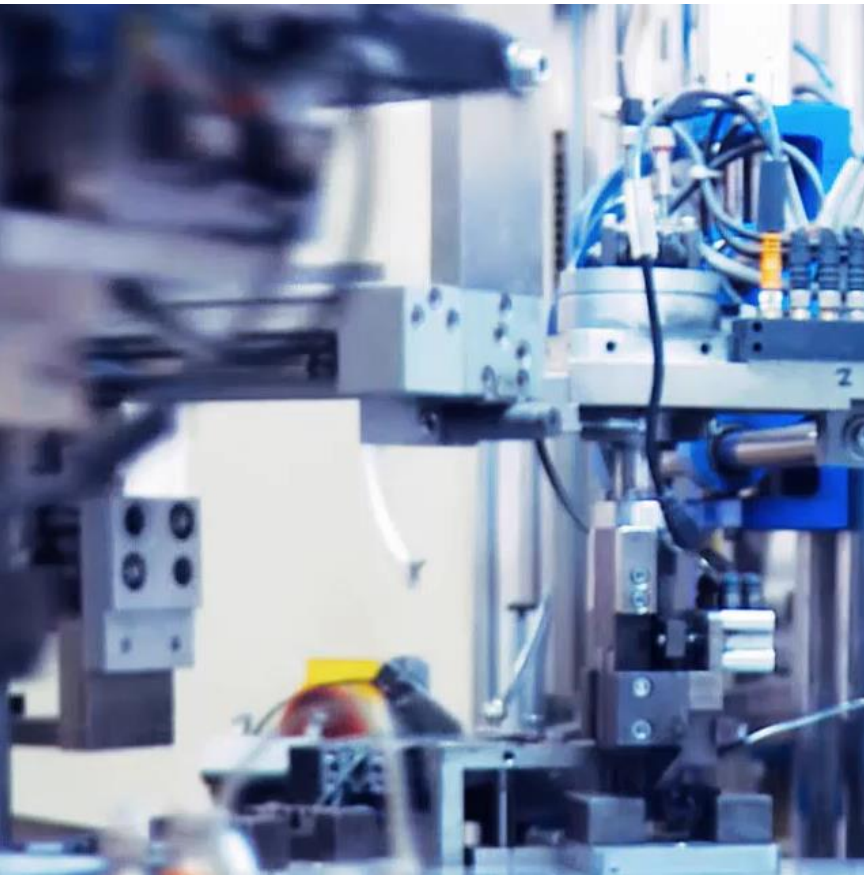
The next Industrial Revolution



The Fourth Industrial Revolution

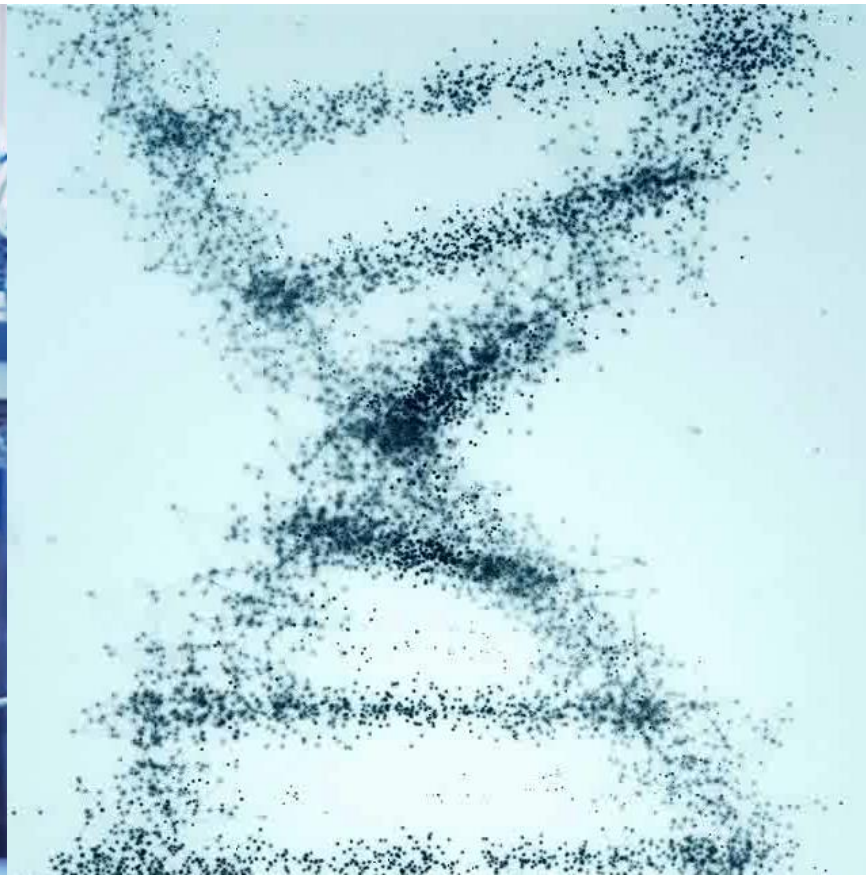
Physical

Autonomous vehicles, robotics,
3D printing, new materials



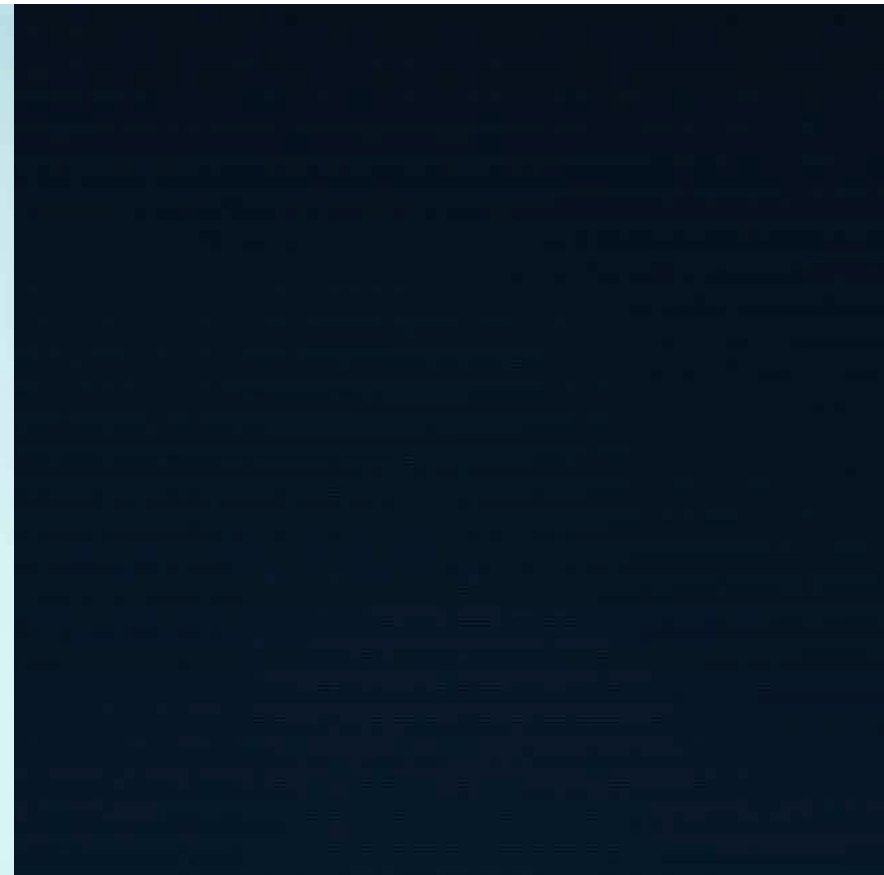
Biological

Genetic diagnostics,
treatment, engineering



Digital

IoT, Blockchain,
disruptive business models



Fourth industrial revolution

**All powered by
technology and
the cloud**

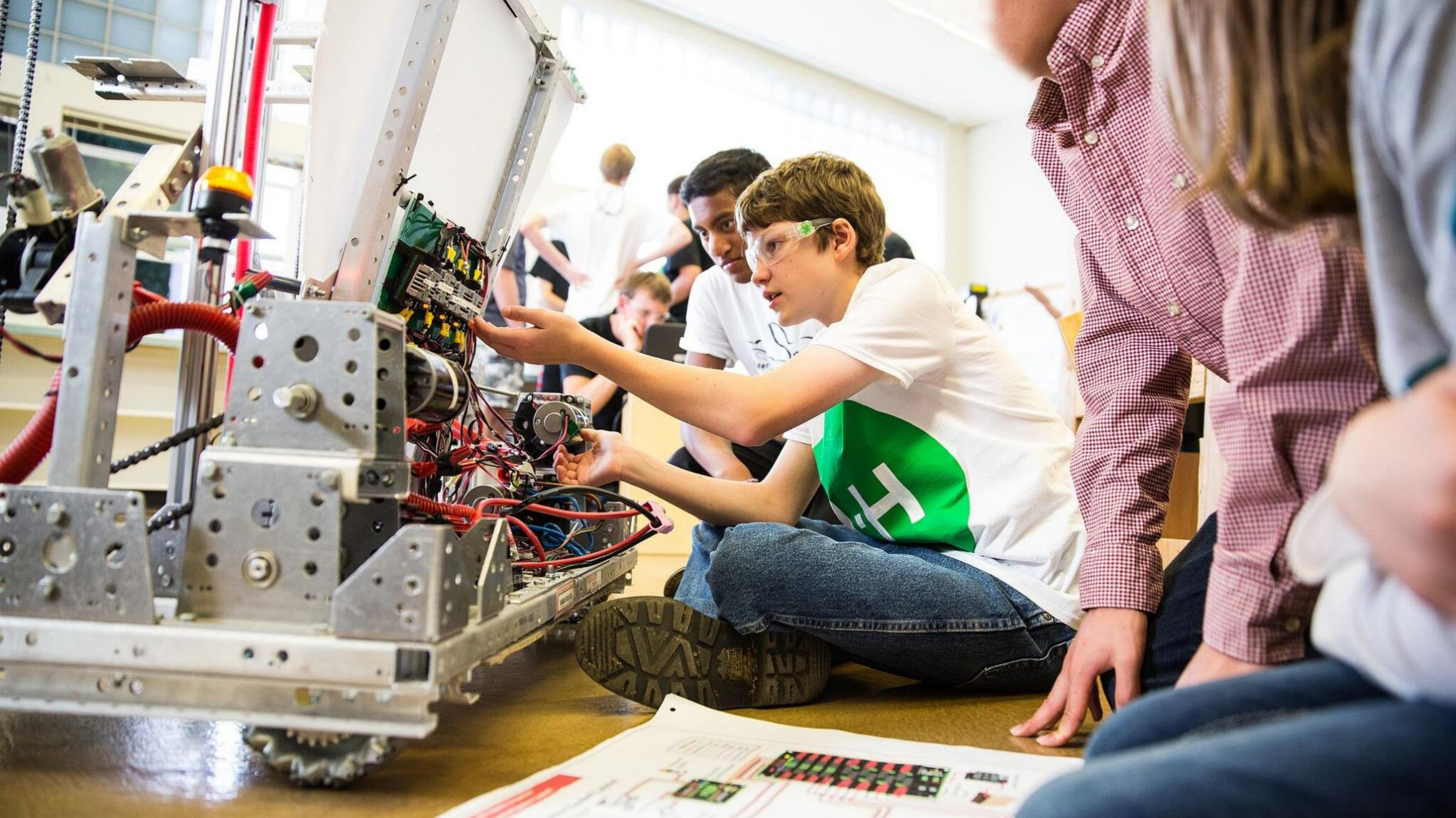


Manufacturing



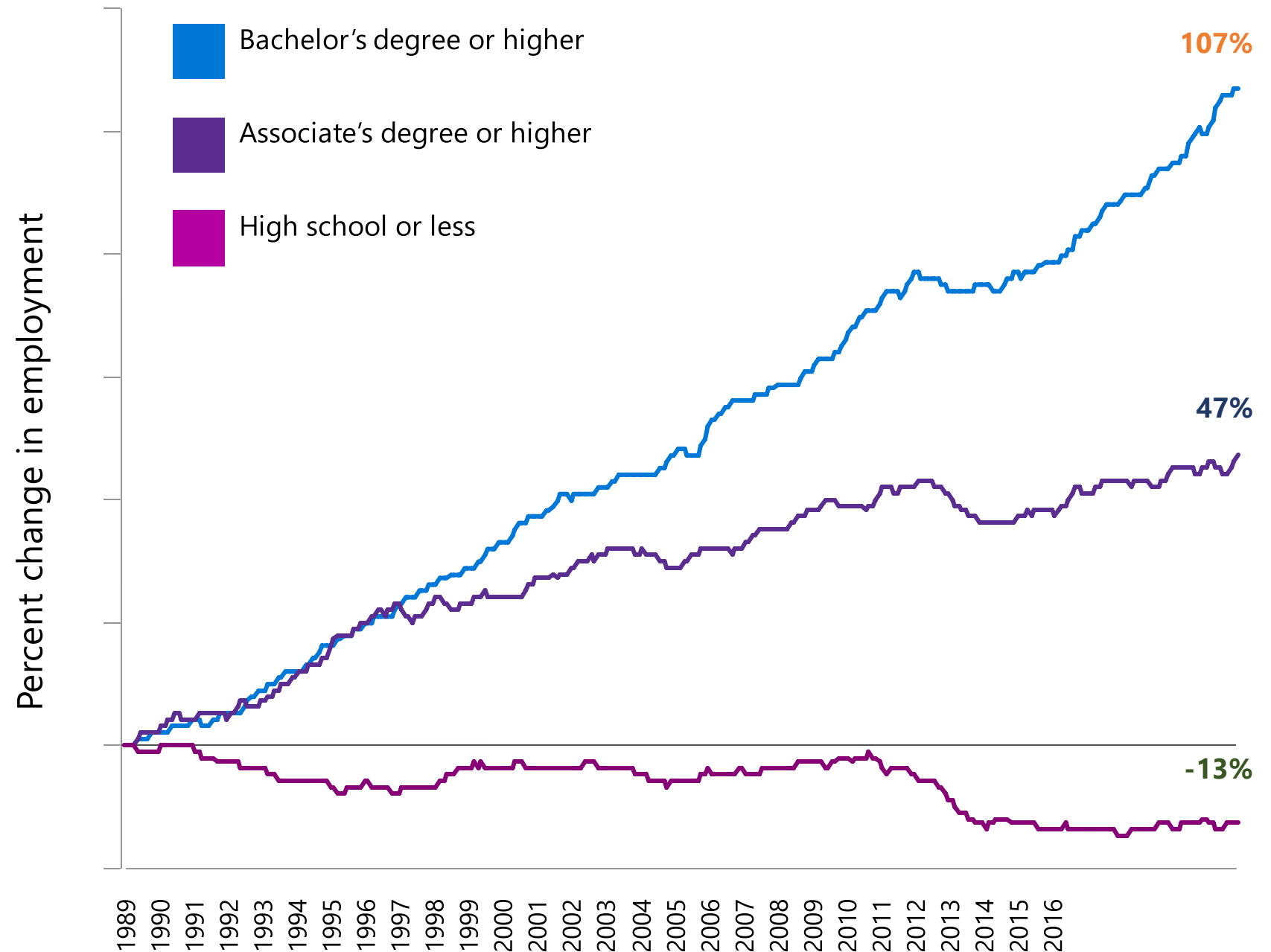








Job Growth in the U.S. Economy



Income Growth in the U.S. Economy

Middle-class wages are stagnant—Middle-wage workers' hourly wage is up 6% since 1979, low-wage workers' wages are down 5%, while those with very high wages saw a 41% increase

Cumulative change in real hourly wages of all workers, by wage percentile,* 1979–2013

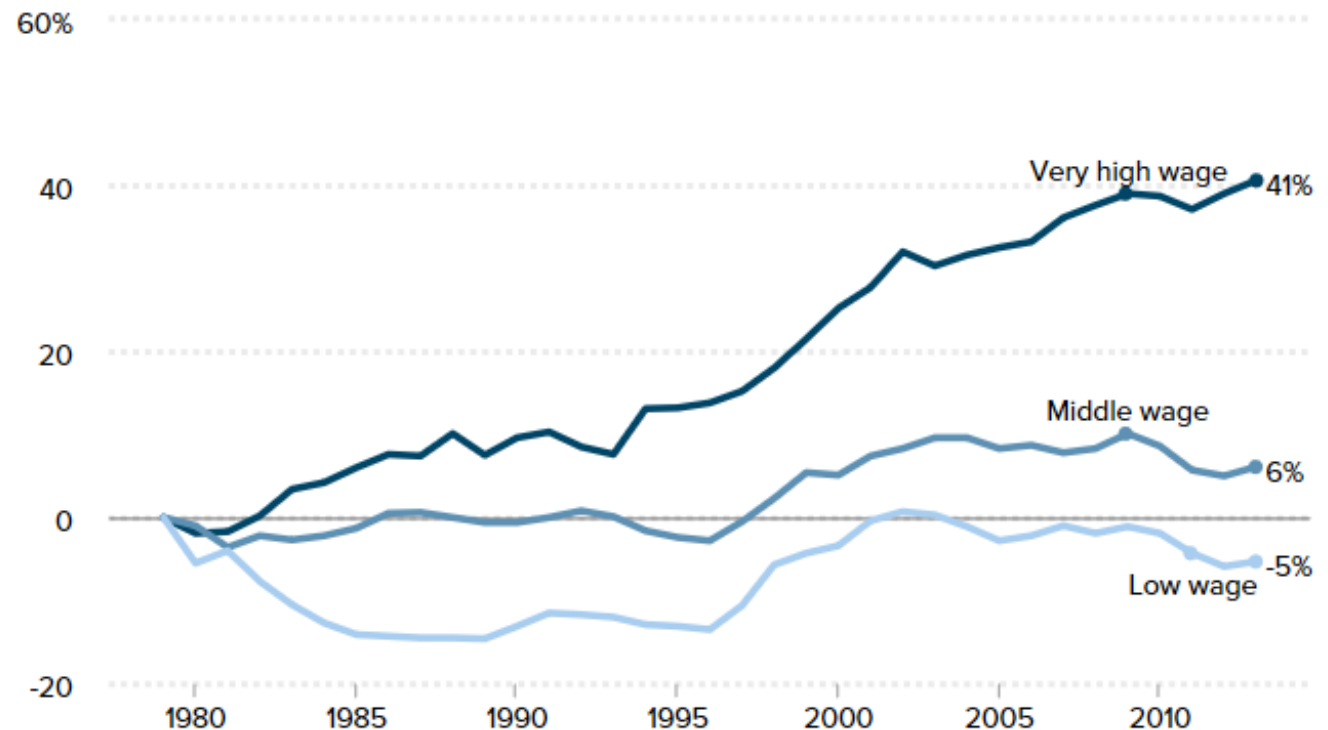


Chart Data

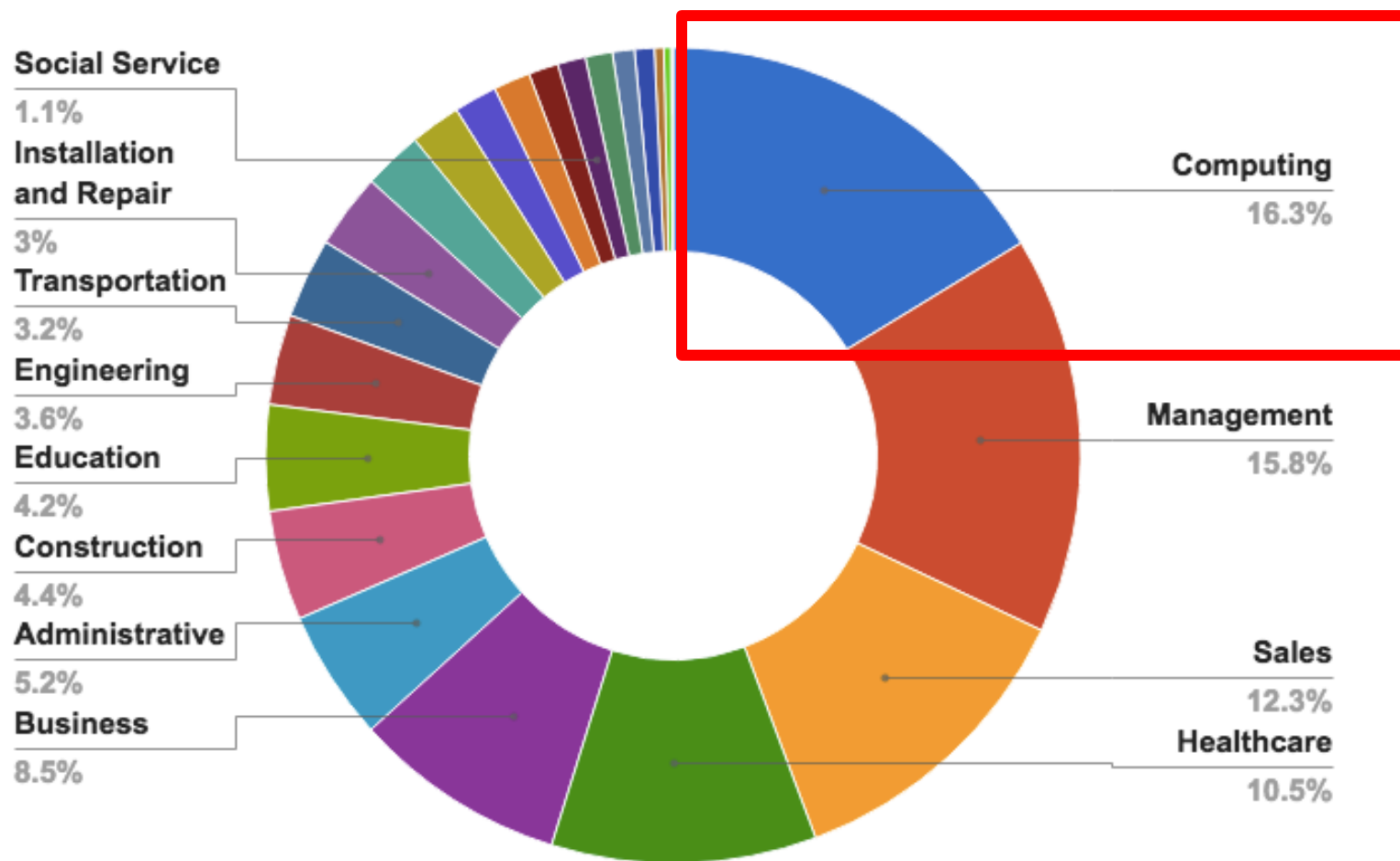
* Low wage is 10th percentile, middle wage is 50th percentile, very high wage is 95th percentile.

Source: EPI analysis of Current Population Survey Outgoing Rotation Group microdata

Where are the
jobs?

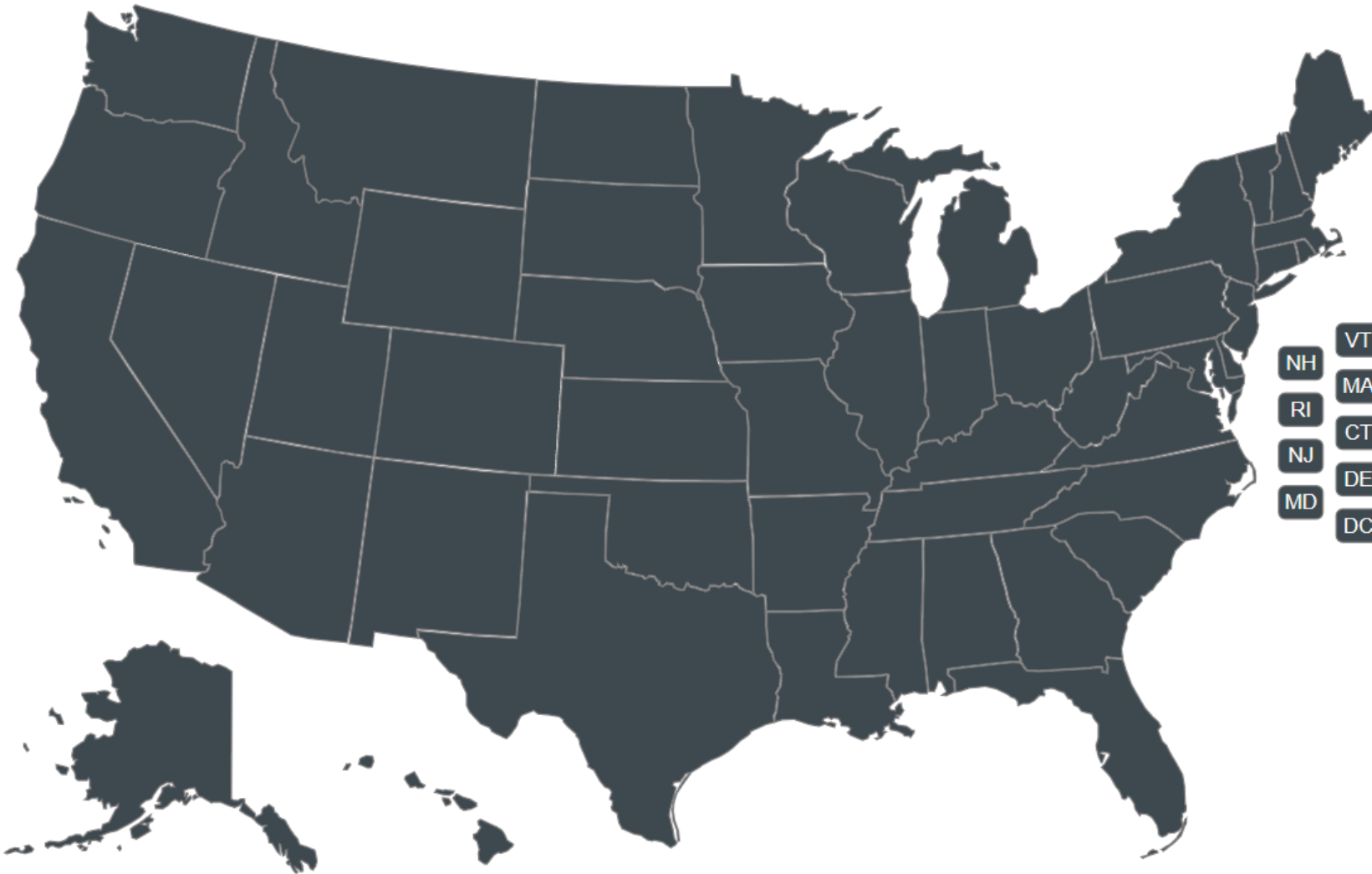


Computing jobs are the #1 source of new wages in the United States



These jobs are in *every* industry and *every* state.

Choose a State

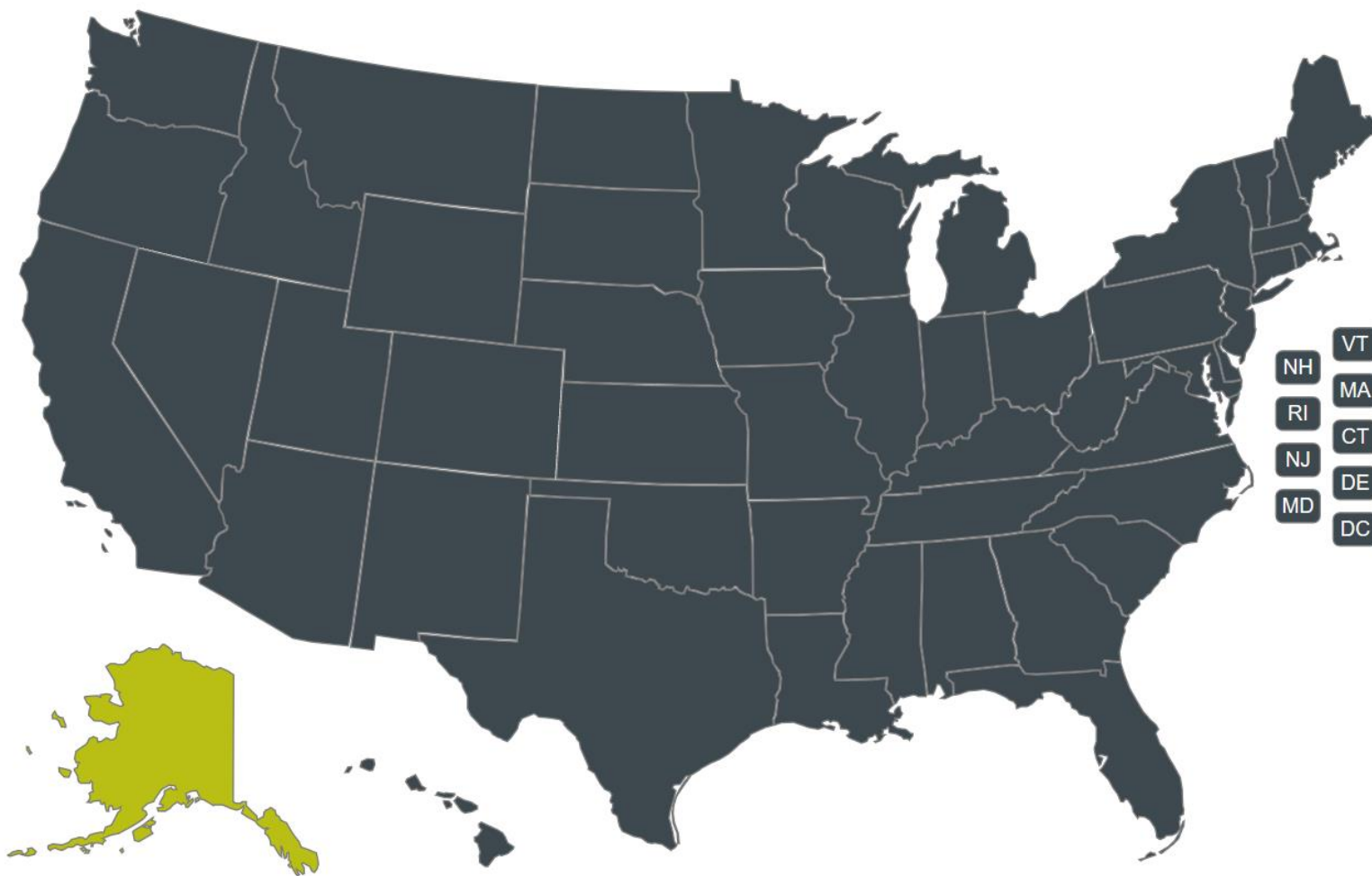


Computer science drives innovation throughout the US economy, but it remains marginalized throughout K-12 education.

- Only **35** states allow students to count computer science courses toward high school graduation.
- There are currently **503,338** open computing jobs nationwide.
- Last year, only **42,969** computer science students graduated into the workforce.

See a [summary of state efforts](#).

Choose a State



Alaska

655 open computing jobs
(2.4x the state average demand rate)

25 computer science graduates

Policy Environment (**rubric**):

No dedicated state funding for CS PD

Does not require all high schools to offer CS

No K-12 CS curriculum standards

▼ AP Stats

8% of schools teach AP CS

68 AP CS exams were taken last year

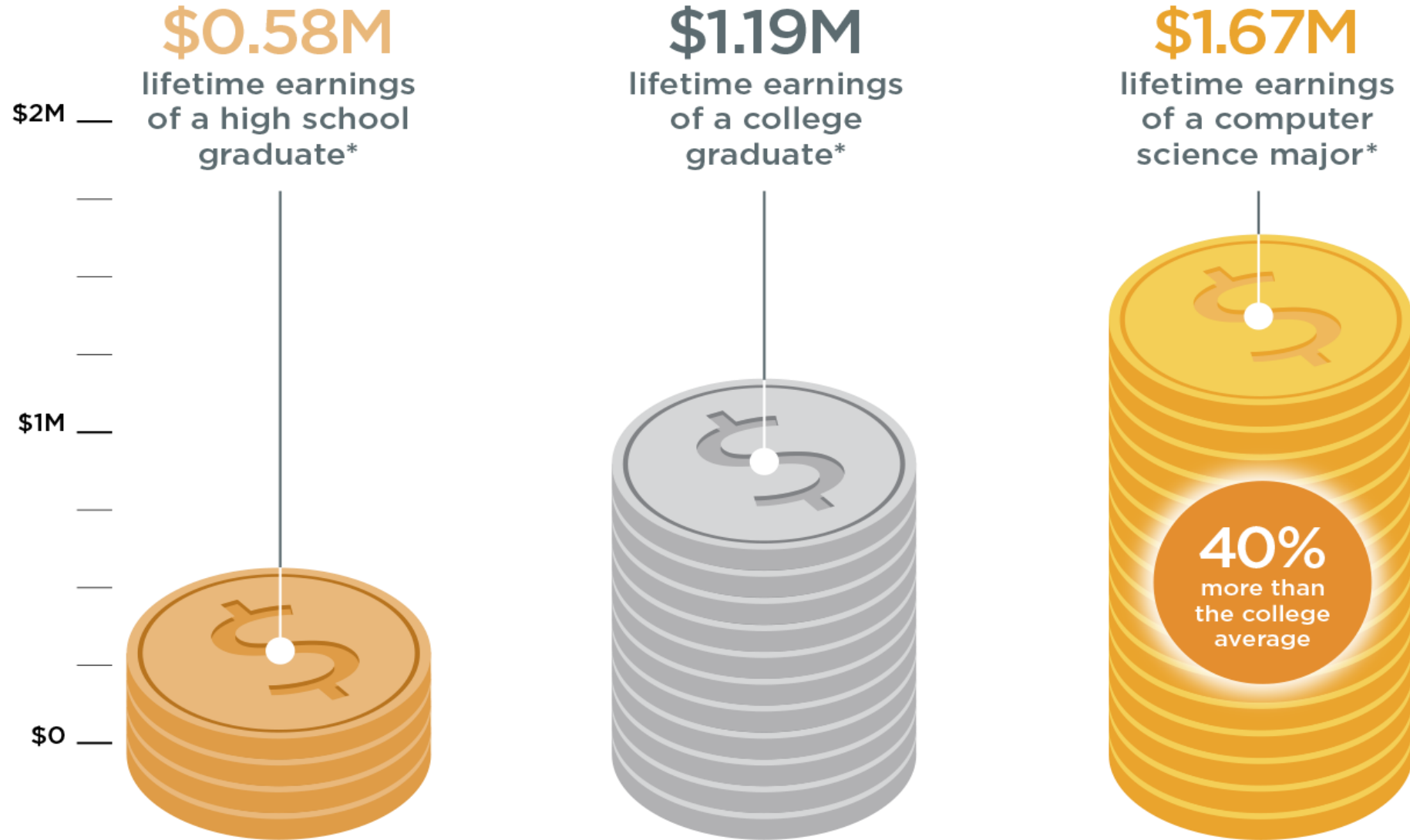
25% of them were female

5 were underrepresented minorities

[View Alaska fact-sheet](#)

Sources: **The Conference Board**, **National Center for Education Statistics**, and the **College Board**. [More info.](#)

The value of a computer science education



*Net present value today

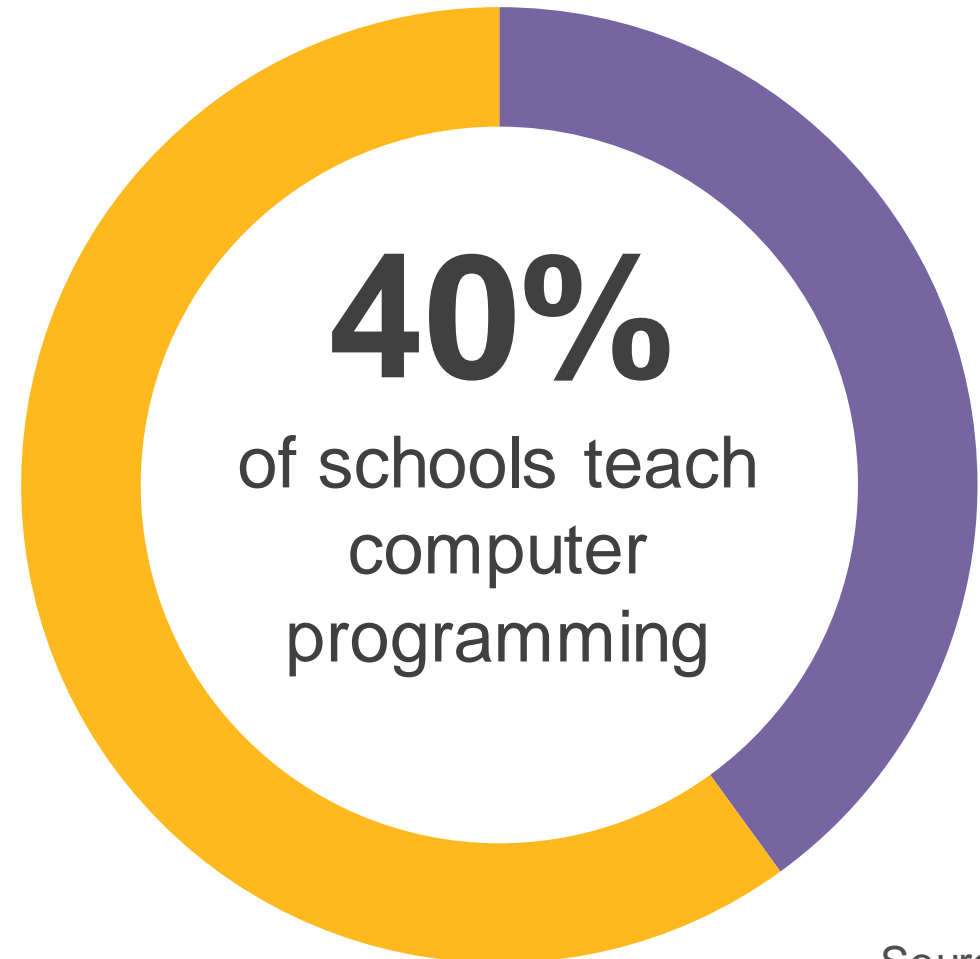
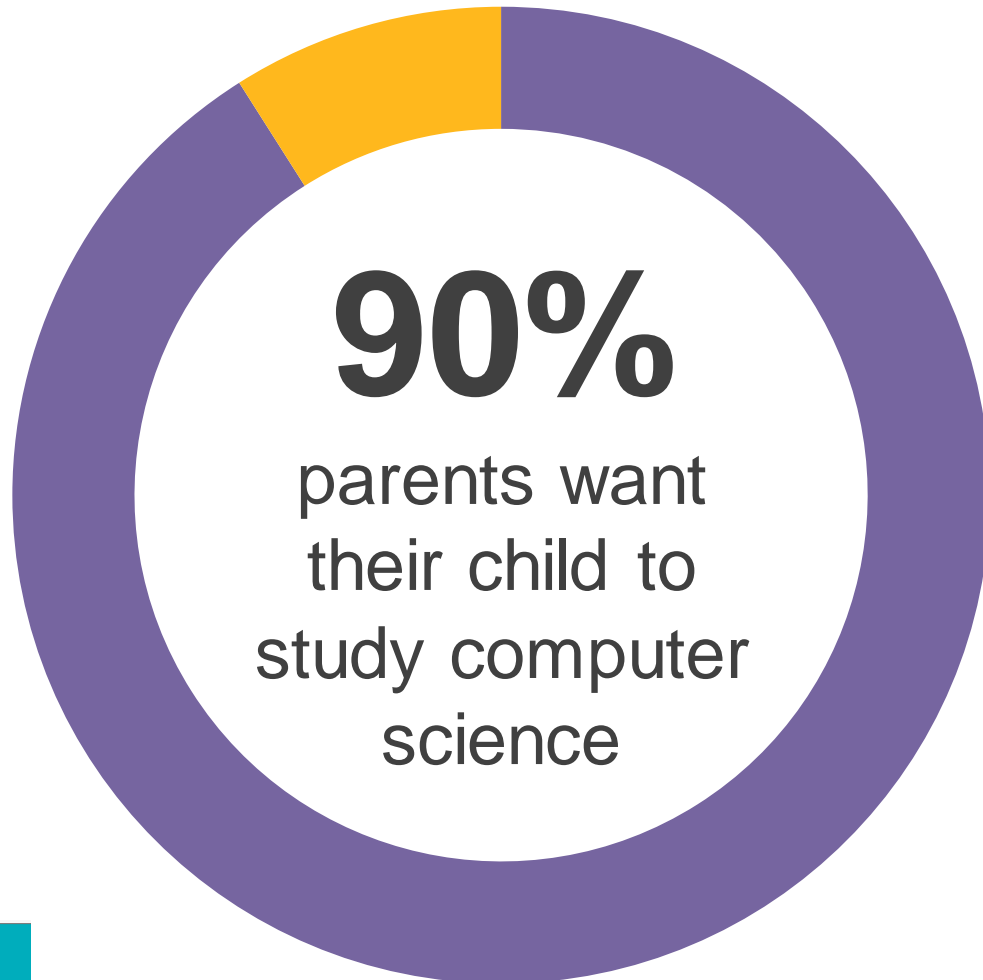
Source: Brookings

The Gap

CS Jobs
&
CS graduates



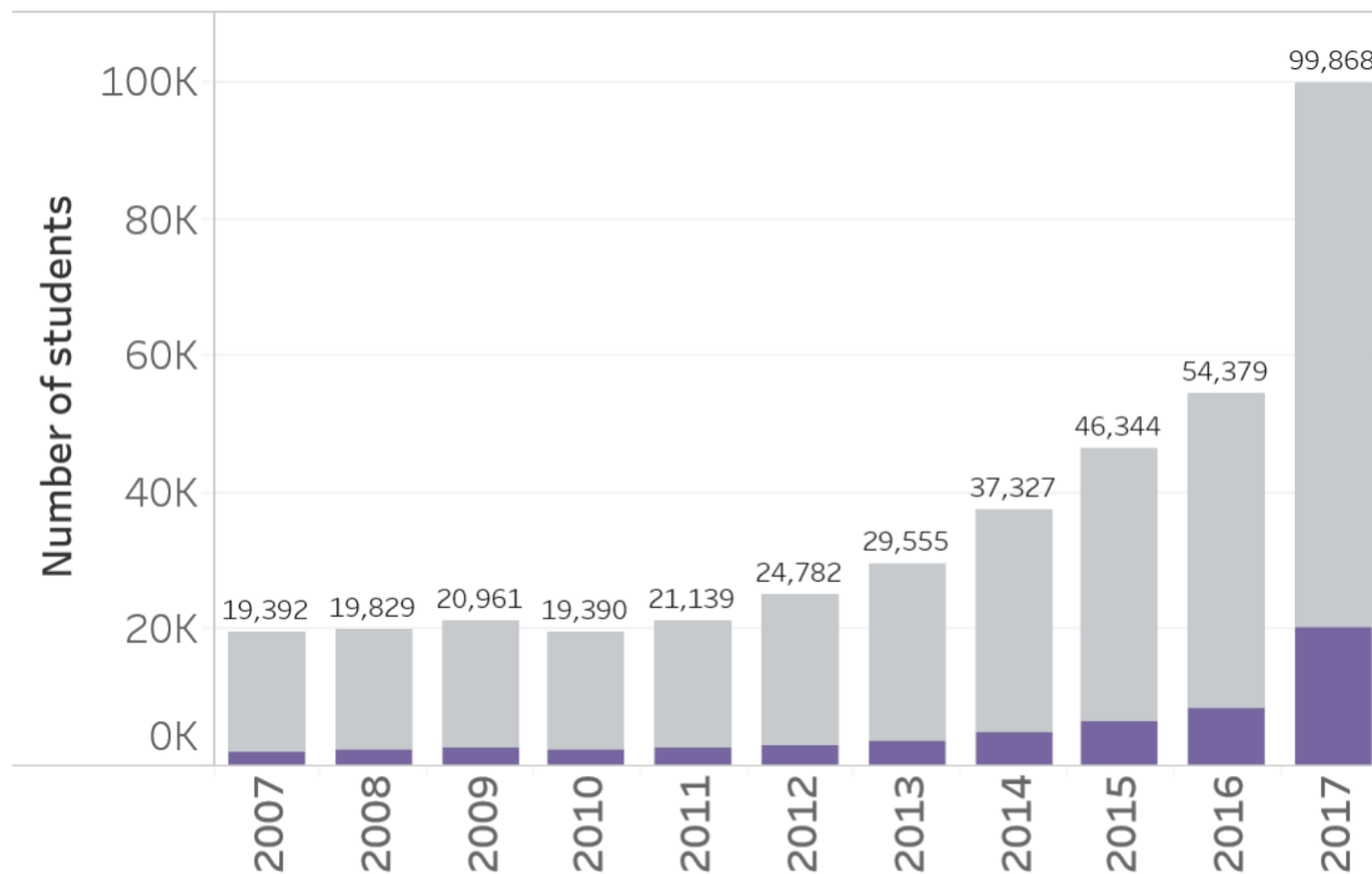
The majority of schools don't teach **computer science**



Source: Gallup

AP Computer Science exam participation by minority status

State: All



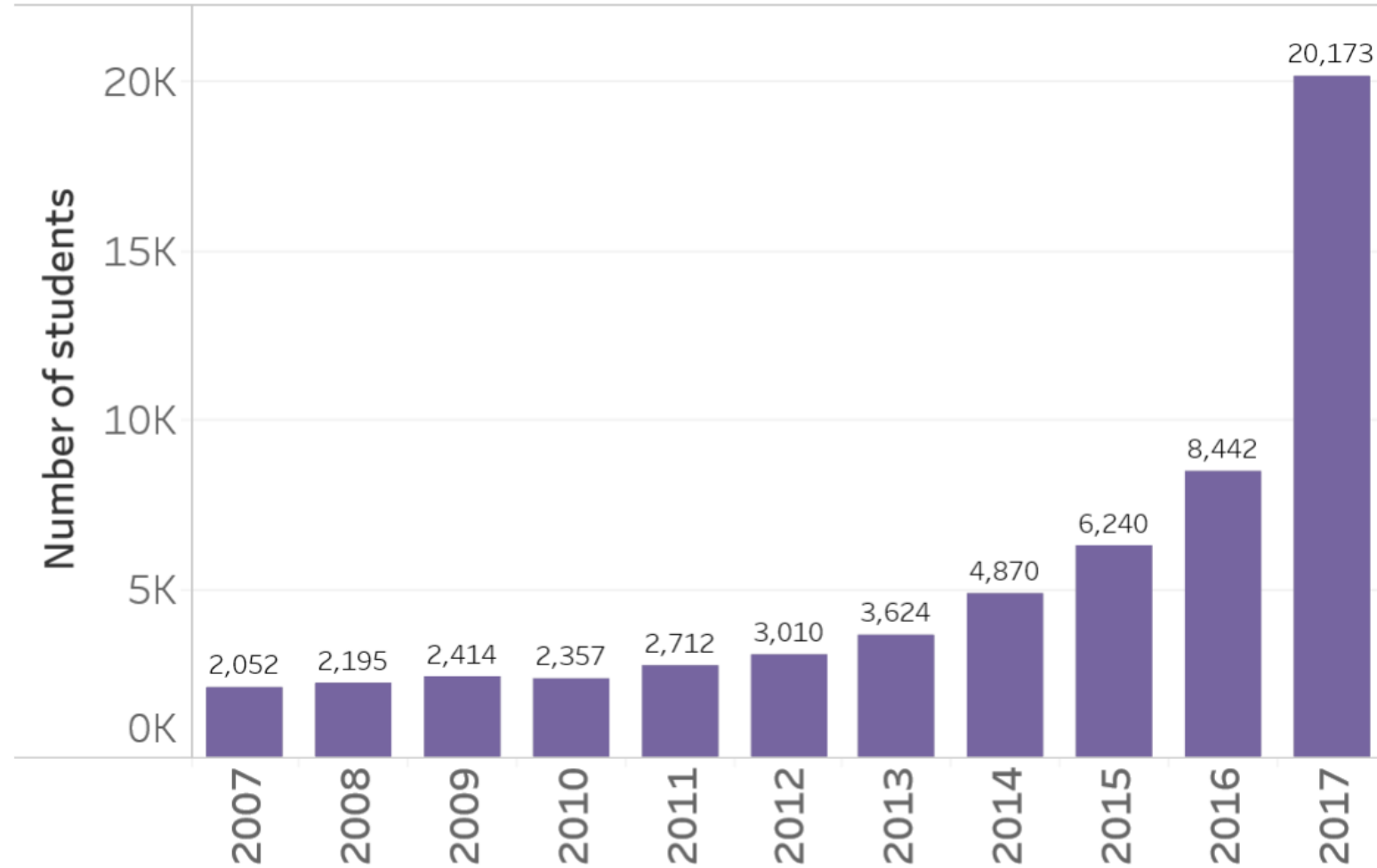
Note: the Computer Science AB exam was offered through 2009, and the Computer Science Principles exam was offered for the first time in 2017.

■ Non-URM

■ Underrepresented minority (URM)

AP Computer Science exam participation by minority status

State: All

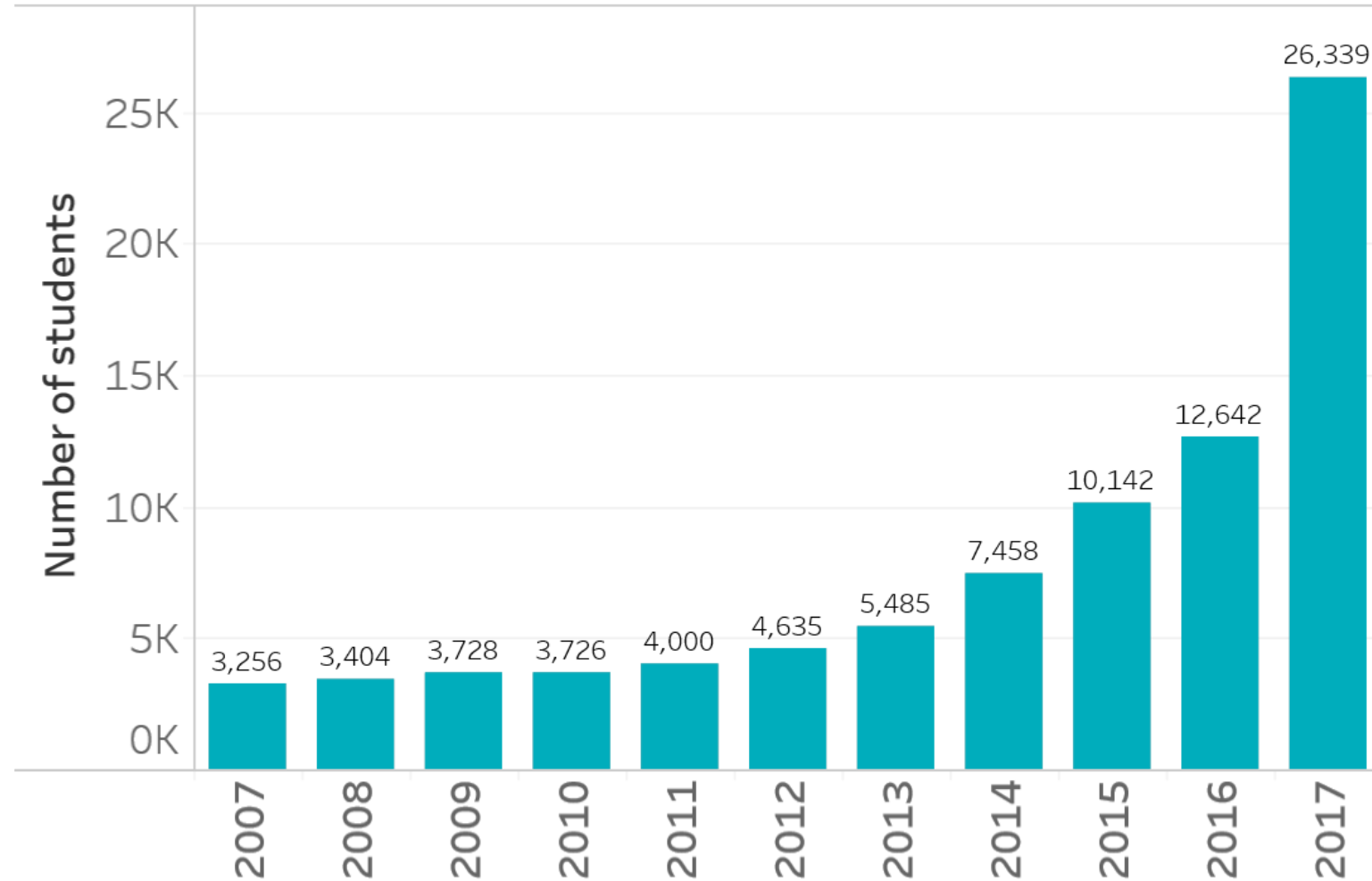


Note: the Computer Science AB exam was offered through 2009, and the Computer Science Principles exam was offered for the first time in 2017.

■ Underrepresented minority (URM)

AP Computer Science exam participation by gender

State: All

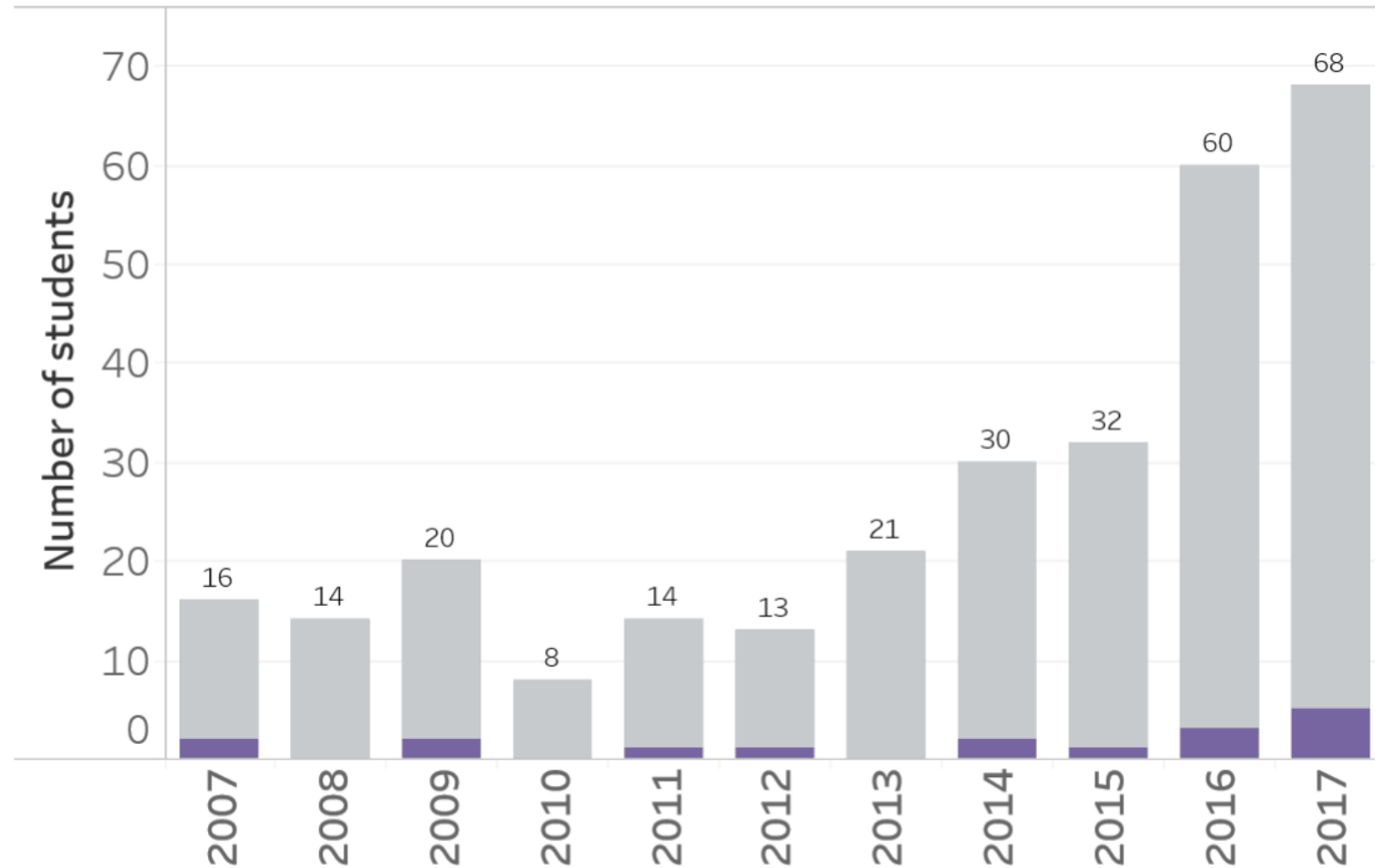


Note: the Computer Science AB exam was offered through 2009, and the Computer Science Principles exam was offered for the first time in 2017.

Female

AP Computer Science exam participation by minority status

State: Alaska



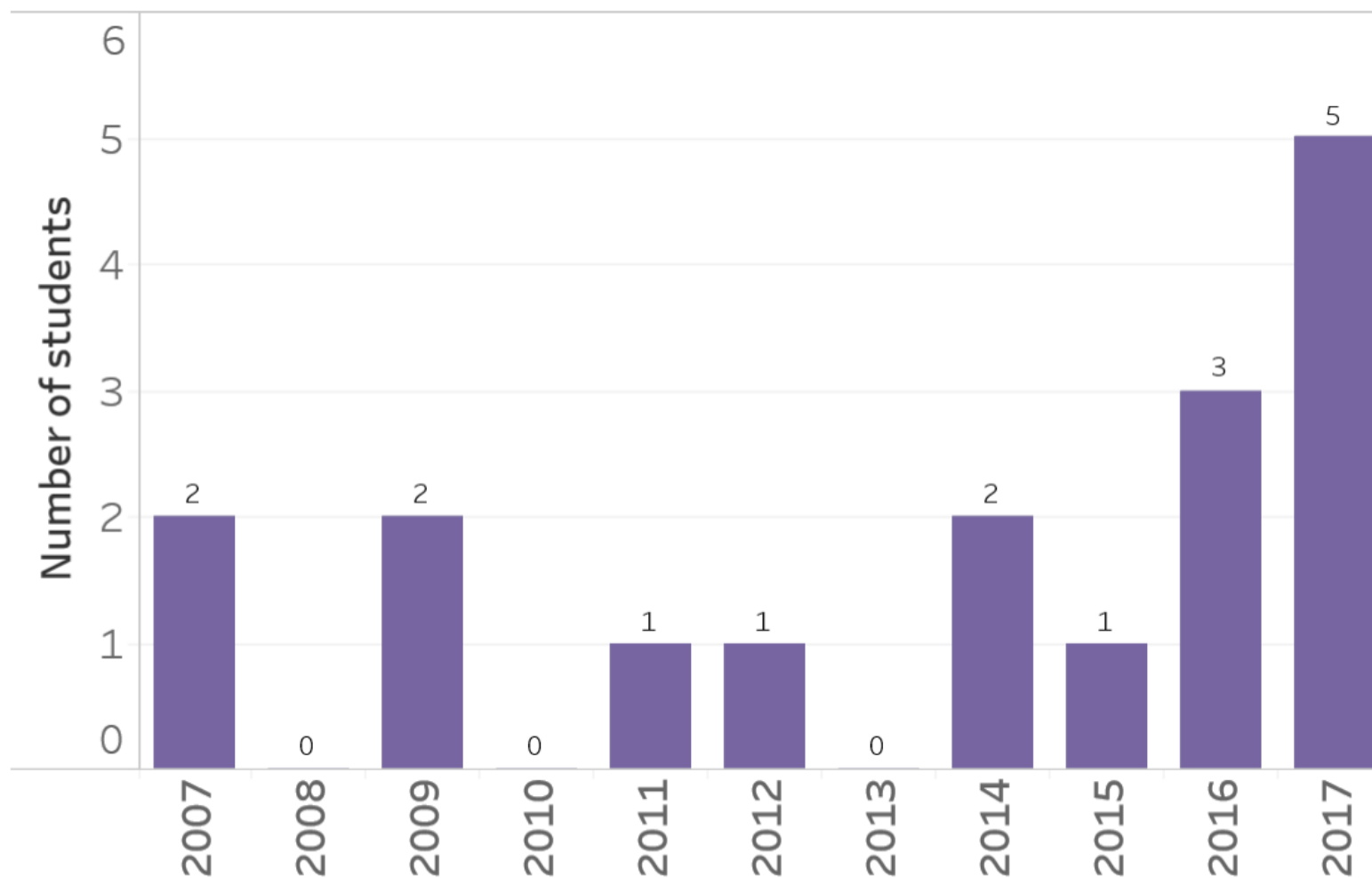
Note: the Computer Science AB exam was offered through 2009, and the Computer Science Principles exam was offered for the first time in 2017.

Non-URM

Underrepresented minority (URM)

AP Computer Science exam participation by minority status

State: Alaska

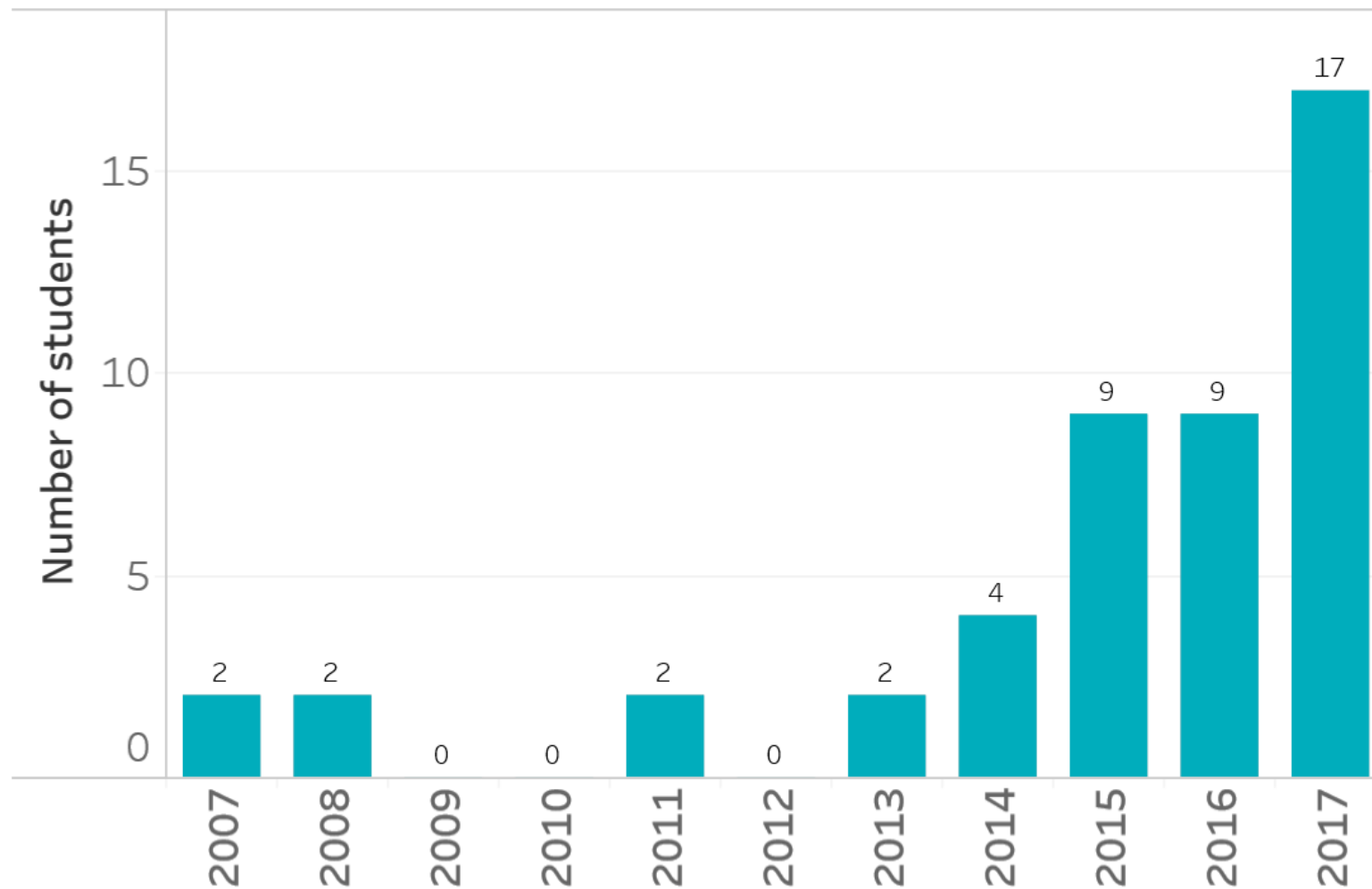


Note: the Computer Science AB exam was offered through 2009, and the Computer Science Principles exam was offered for the first time in 2017.

■ Underrepresented minority (URM)

AP Computer Science exam participation by gender

State: Alaska



Note: the Computer Science AB exam was offered through 2009, and the Computer Science Principles exam was offered for the first time in 2017.

Female

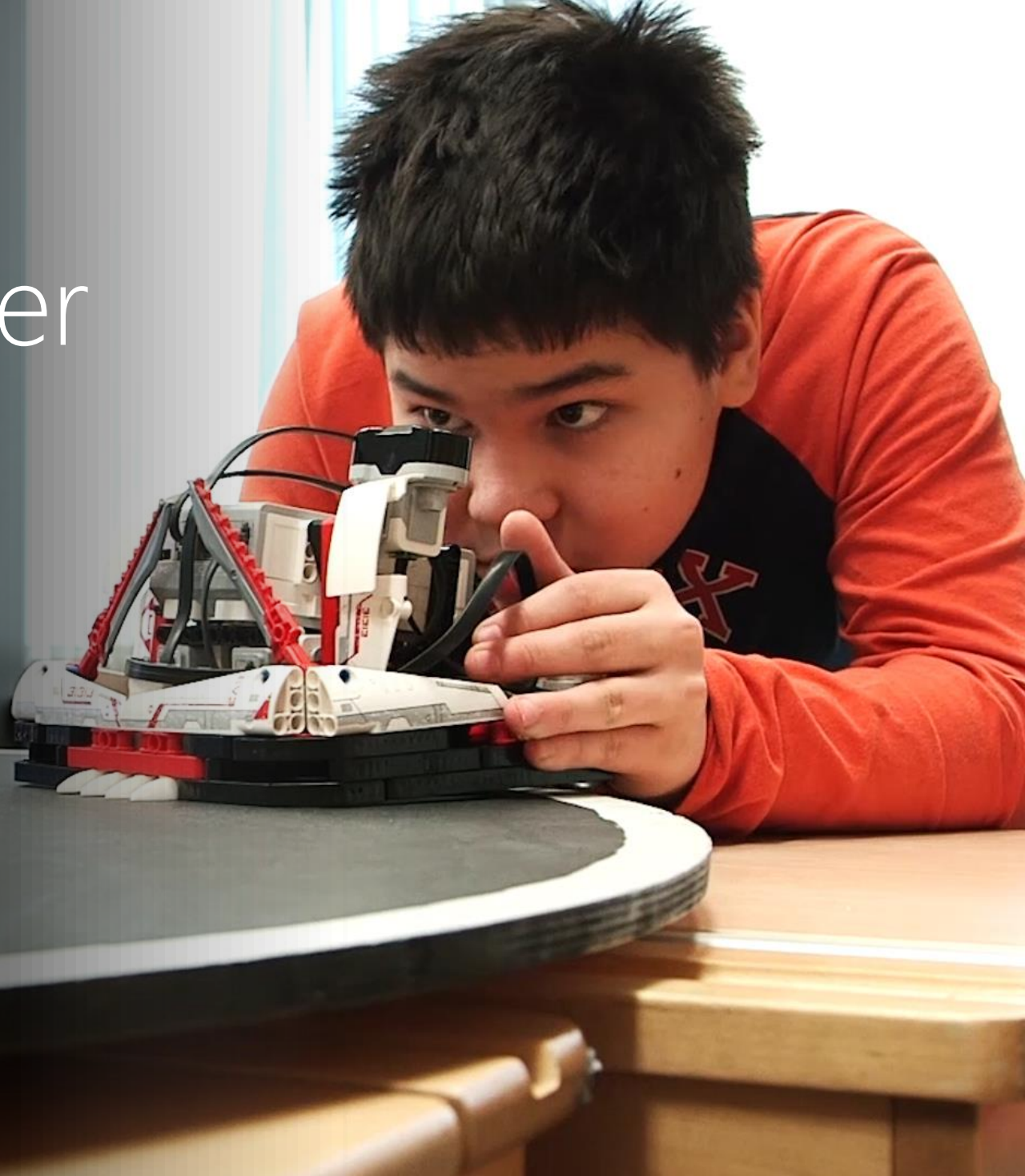
83% of parents and 64% of principals in rural and small towns believe CS is **more** or **equally** as **important** as any other required course

Source: Code.org



Closing the Computer Science Gap

What can you do?

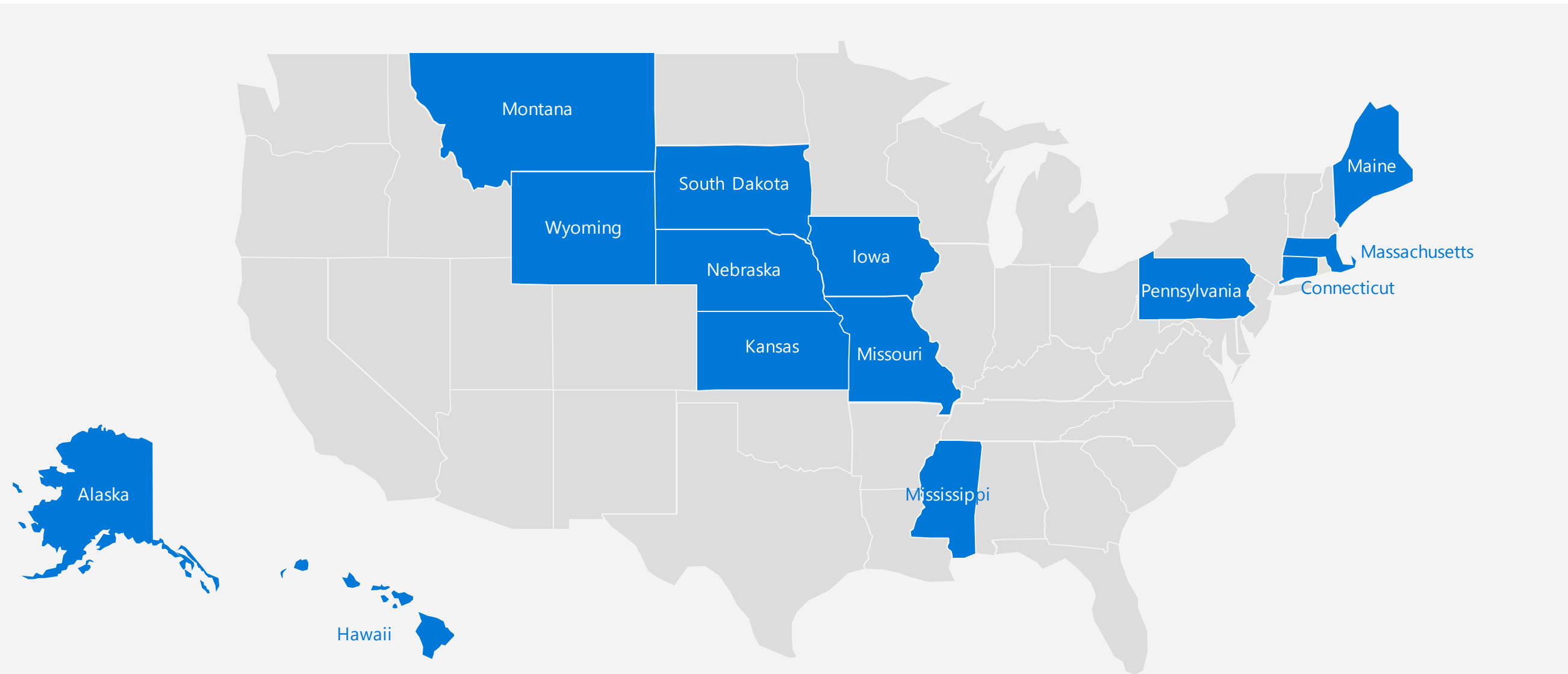


Make Computer Science Count

as a Core Math or
Science High School
Graduation Credit



Remaining states to **make computer science count**



Expand the Supply of CS Teachers







School Year	Schools	Total Students	AP Students	TEALS Volunteers
2009-2010	1	12	0	1
2010-2011	4	250+	18	10
2011-2012	13	800+	67	40
2012-2013	35 (7 states)	1500+	400+	100
2013-2014	70 (12 states)	3385	1278	280
2014-2015	131 (18 states+DC)	4800	1885	475
2015-2016	162 (17 states+DC)	6000	2775	550
2016-2017	225 (25 states+DC)	9000	3400	750
2017-2018	349 (29 states+DC)	12,000	TBD	1050

Create Teacher Certification Pathways

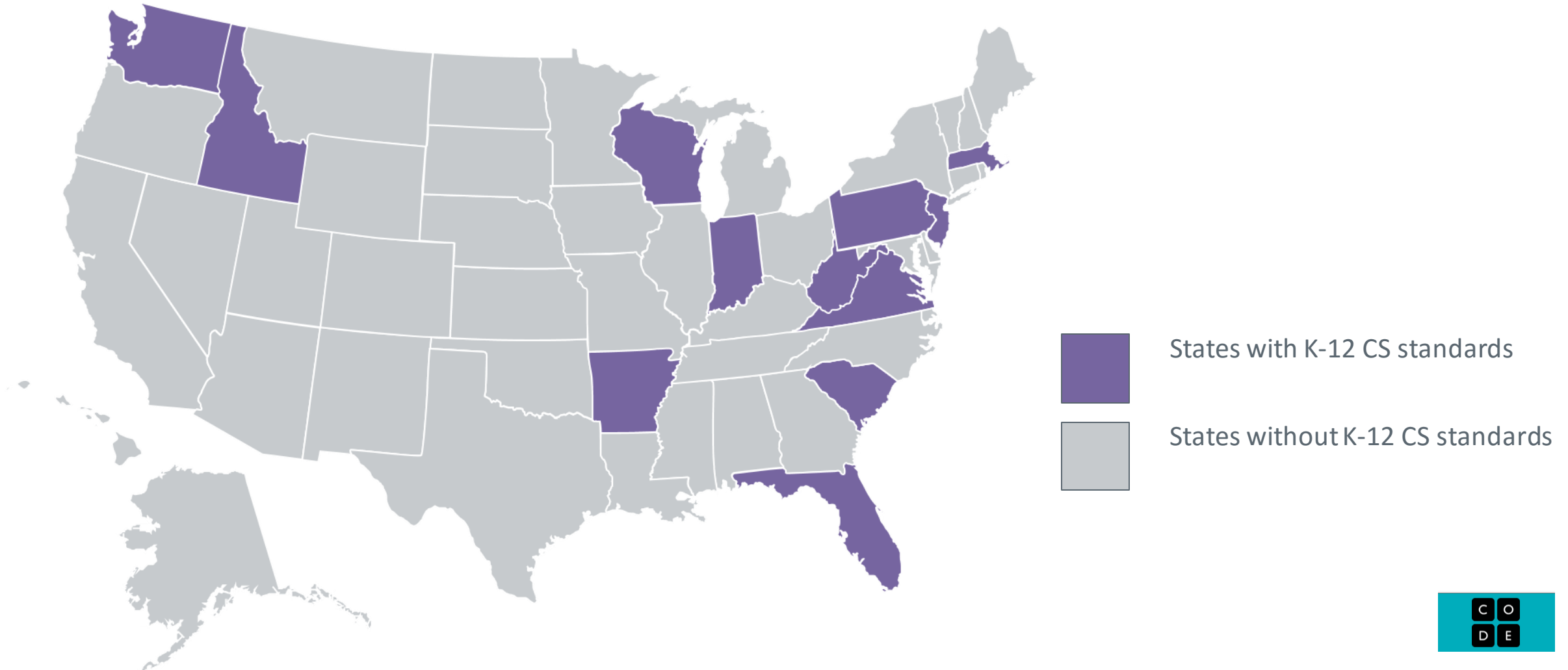


Create Computer Science Standards



The state of K-12 computer science standards

Only 12 states have created K-12 computer science standards. Momentum is building, but we still have a long way to go.



Invest in
career
connected
learning



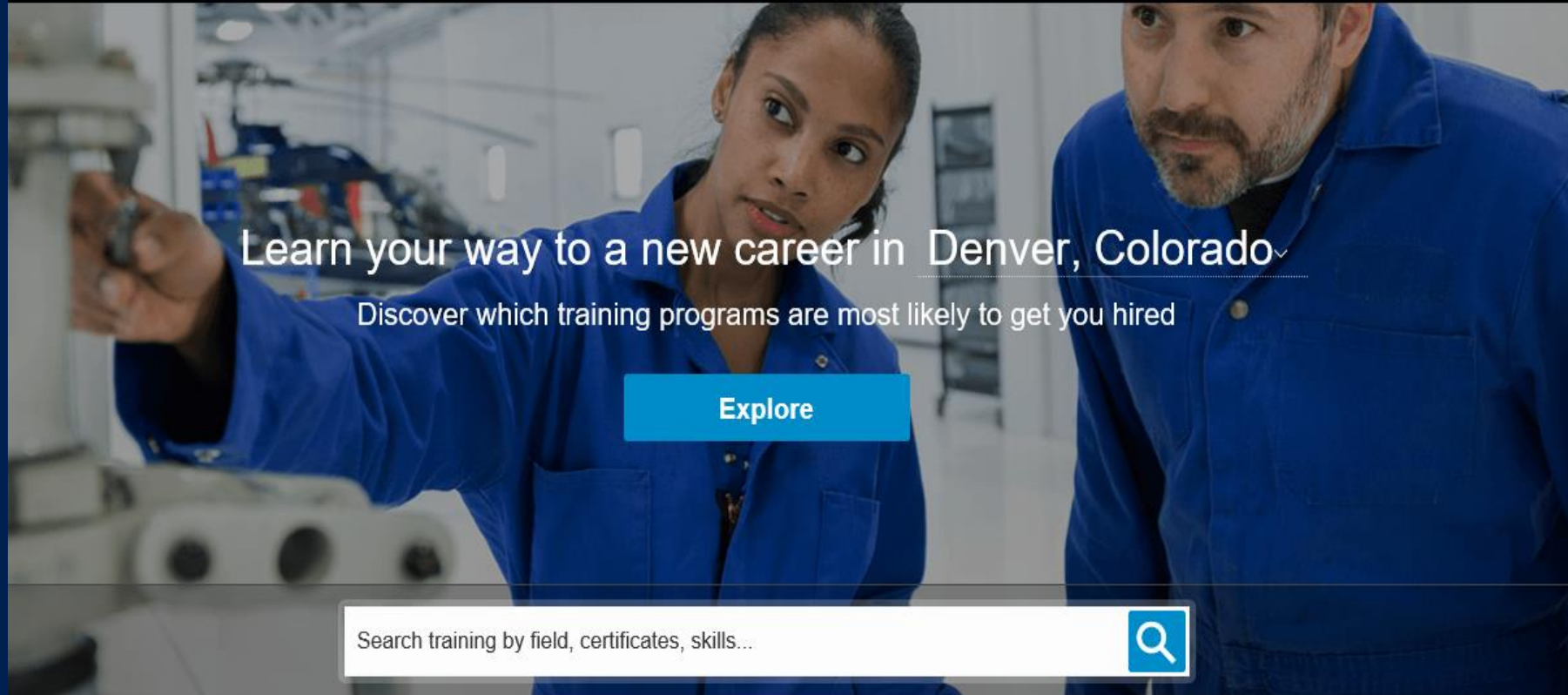


Manage your training programs.

Sign in



Training
to help
people
get hired



Learn your way to a new career in Denver, Colorado

Discover which training programs are most likely to get you hired

Explore

Search training by field, certificates, skills...



Explore training programs and possible careers



Information Technology



Business, Legal, Finance &
Marketing



Healthcare & Wellness



Manufacturing, Architecture &
Engineering



THE ECONOMIC GRAPH

Microsoft Software & Systems Academy



Top 3 roles

Software Engineer
Sales Supporters
Service Engineers

92%

of students graduate from
MSSA

240

Total number of companies
(other than Microsoft) that have
hired graduates

Learning Paths



Cloud Application Development

A current Microsoft Software Development Fundamentals (MTA) certification is a prerequisite for this learning path. Take the [MTA Software Development Fundamentals Training](#) and explore introductory concepts for HyperText Markup Language (HTML), Cascading Style Sheets (CSS) and JavaScript.



Cybersecurity Administration

A current CompTIA Security+ or Microsoft Security Fundamentals (MTA) certification is a prerequisite for this learning path. To gain the MTA certification, take the [MTA Security Fundamentals Training](#) to find out how to put the many pieces together to build a functional and secure network. To access the CompTIA certification training, please check with our MSSA academic partner (ERAU or SMU) for



Database & Business Intelligence Administration

A current Microsoft Database Fundamentals (MTA) certification is a prerequisite for this learning path. To gain the MTA certification, take the [MTA Database Fundamentals Training](#), designed for individuals seeking to learn database fundamentals, including relational databases, database management systems and database components.



Server & Cloud Administration

A current CompTIA Network+, CompTIA Security+ or Microsoft Networking Fundamentals (MTA) certification is a prerequisite for this learning path. To gain the MTA certification, take the [MTA Networking Fundamentals Training](#) to find out how to put the many pieces together to build a functional and secure network. To access the CompTIA certification training, please check with our

An aerial photograph of a rural landscape at dusk or dawn. The scene features a road intersection, several houses, and large fields. The lighting is soft and atmospheric, with a warm glow from the low sun. The text "Microsoft's Rural Airband Initiative" is overlaid in the center in a white, sans-serif font.

Microsoft's Rural Airband Initiative

34 million Americans
don't have access
to broadband



23.4 million reside
in rural communities



A clear **goal**

Close the rural
broadband gap in 5 years

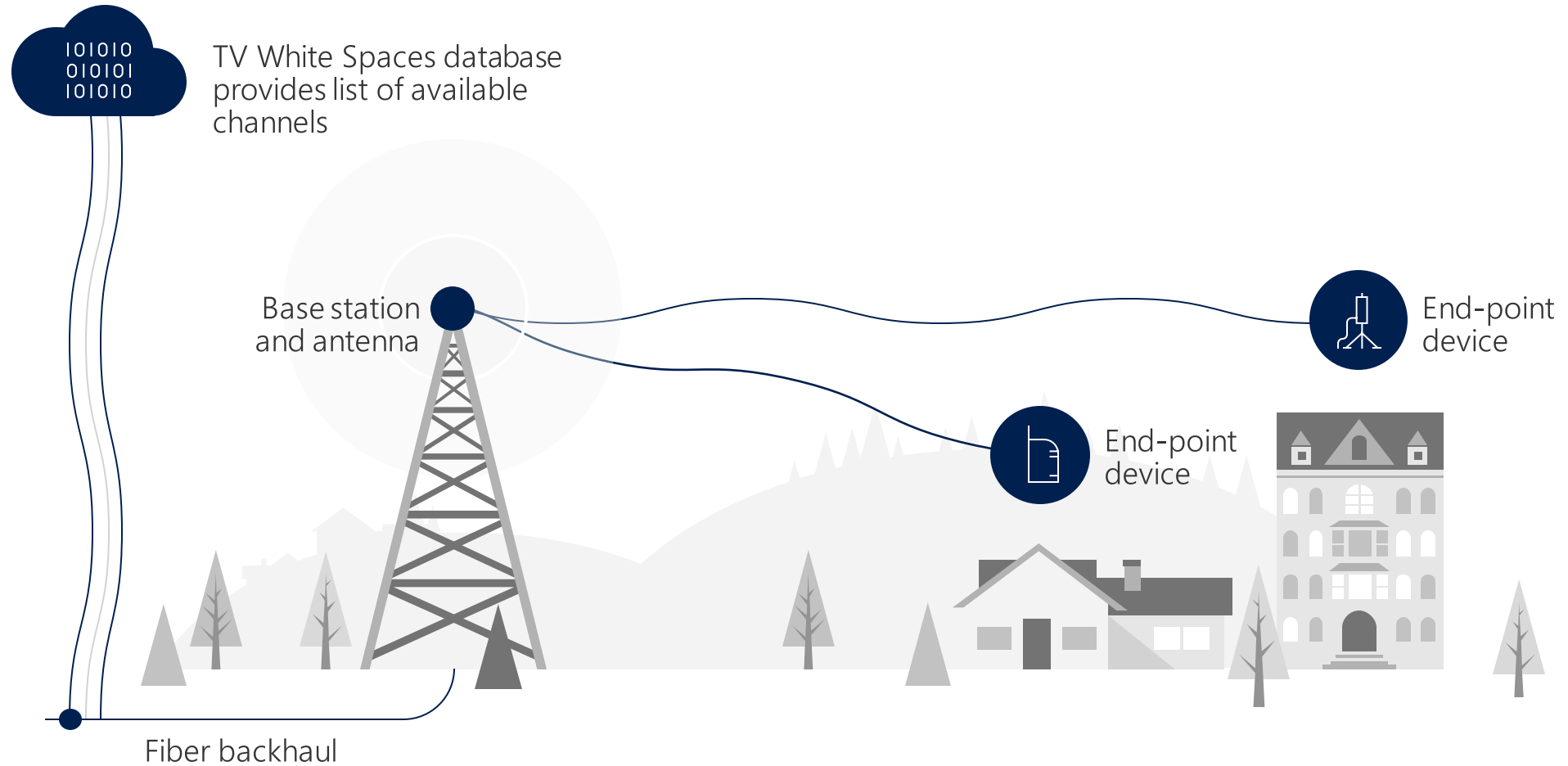
July 4, 2022



Using vacant channels
on the **TV spectrum**



How TV White Spaces works



Deploy a new
mixture of technologies

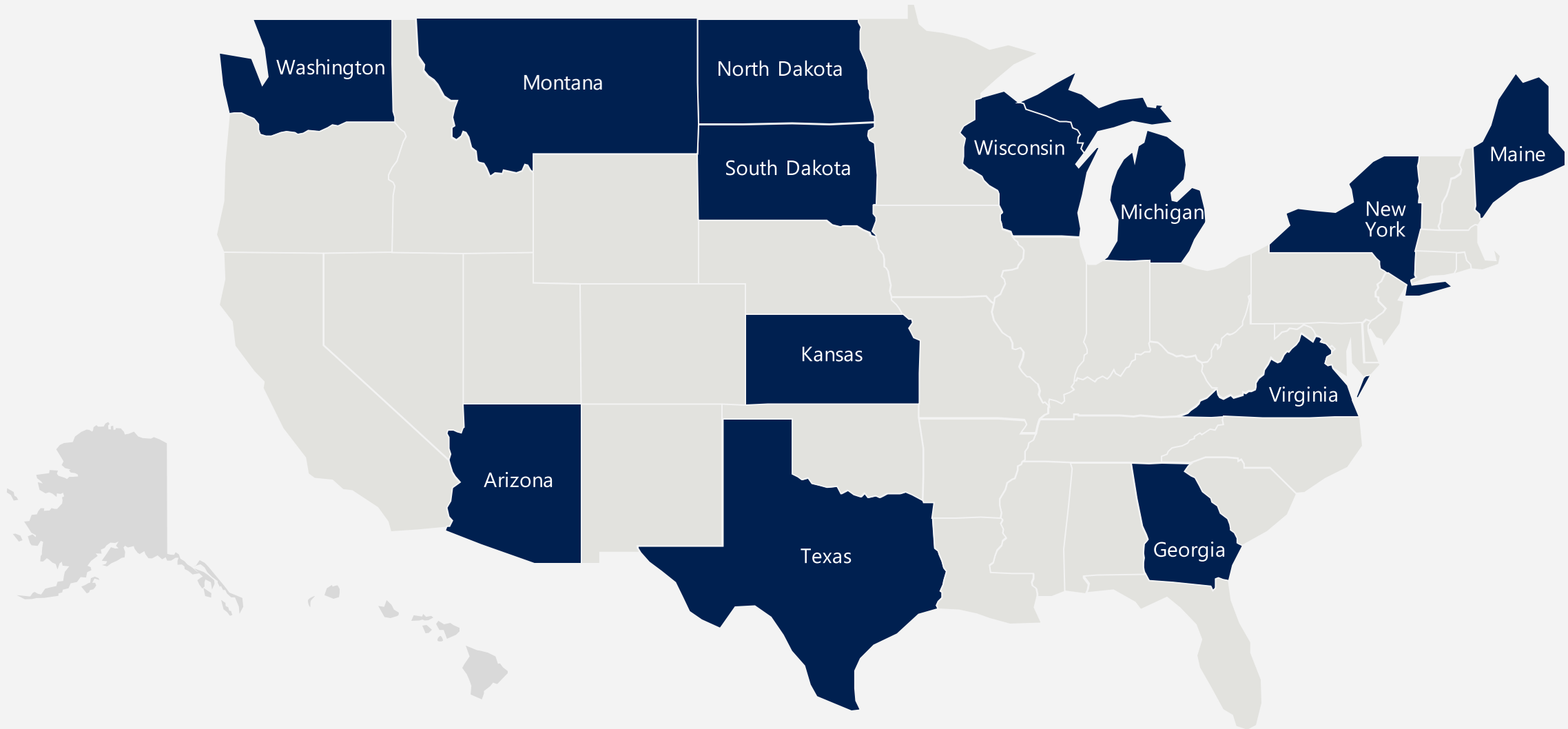


Microsoft's Rural **Airband** Initiative

An aerial photograph of a rural landscape during the "golden hour" of late afternoon. The scene features rolling green fields, scattered trees, and a paved road that intersects with a dirt path. In the upper right, a small cluster of white houses with dark roofs is visible. The low sun creates long, warm shadows and a hazy, golden light across the entire scene.

Connecting **2 million** people in **5 years**

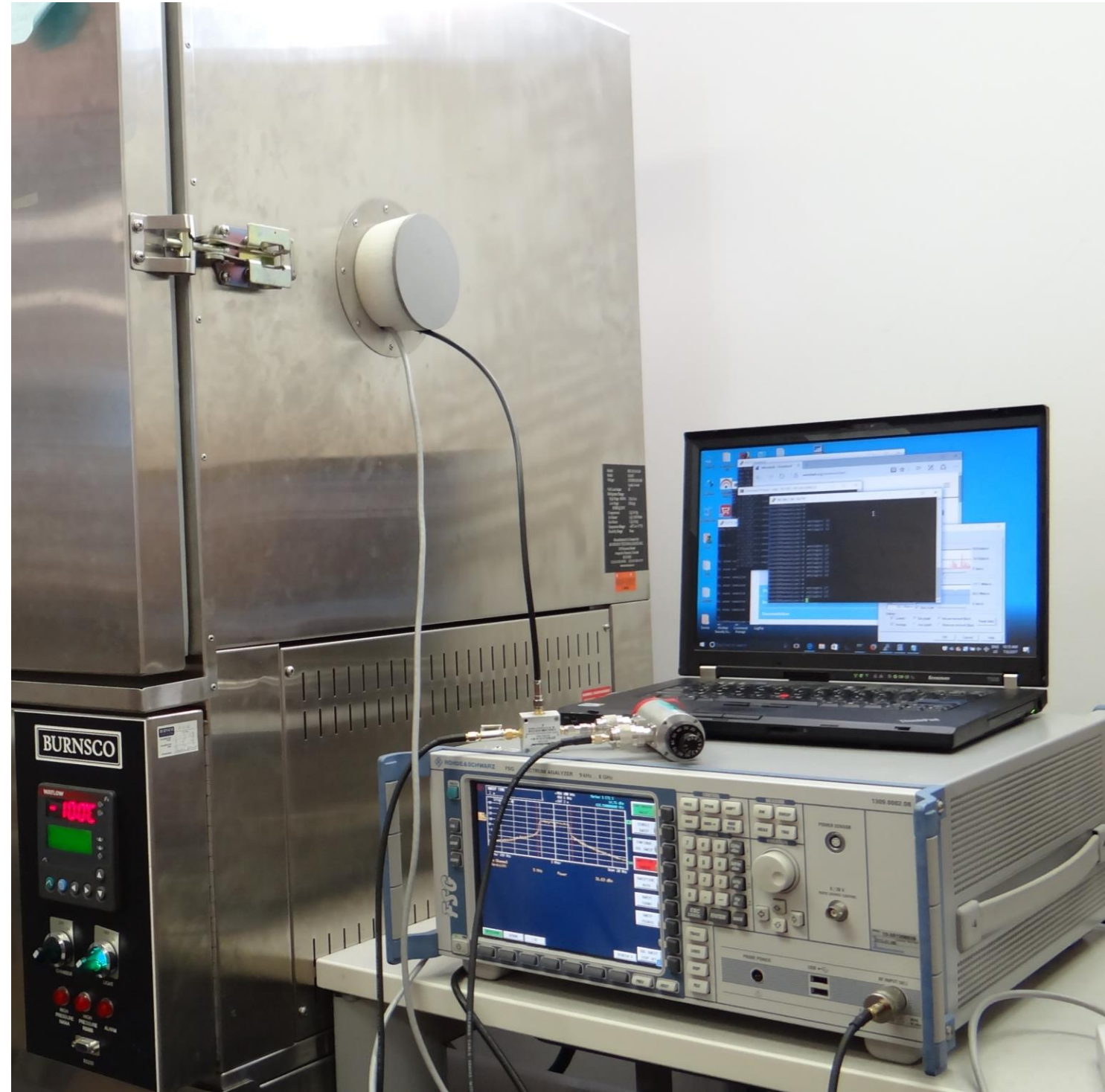
Microsoft Airband projects across the country



A partnership
reaching **youth**
living in rural America



Stimulate market
by **licensing**
our technology



A person with dark, curly hair, wearing a green and blue striped long-sleeved shirt and dark pants, is sitting cross-legged on a blue mosaic floor. They are holding a tablet computer in their lap and looking at the screen. The tablet displays a colorful interface with various icons and text. The person is wearing orange and brown sneakers. The background is a large, blue mosaic floor with a repeating pattern of small, irregular tiles. The overall lighting is soft and even.

Questions?