

A photograph of three students in a classroom. Two girls are in the foreground, looking down at a tablet device. A boy is partially visible behind them, also looking at the screen. The background shows bookshelves and other classroom elements.

Computer Science Education & Workforce Development

Ryan Harkins
Director of Public Policy
Microsoft Corporation



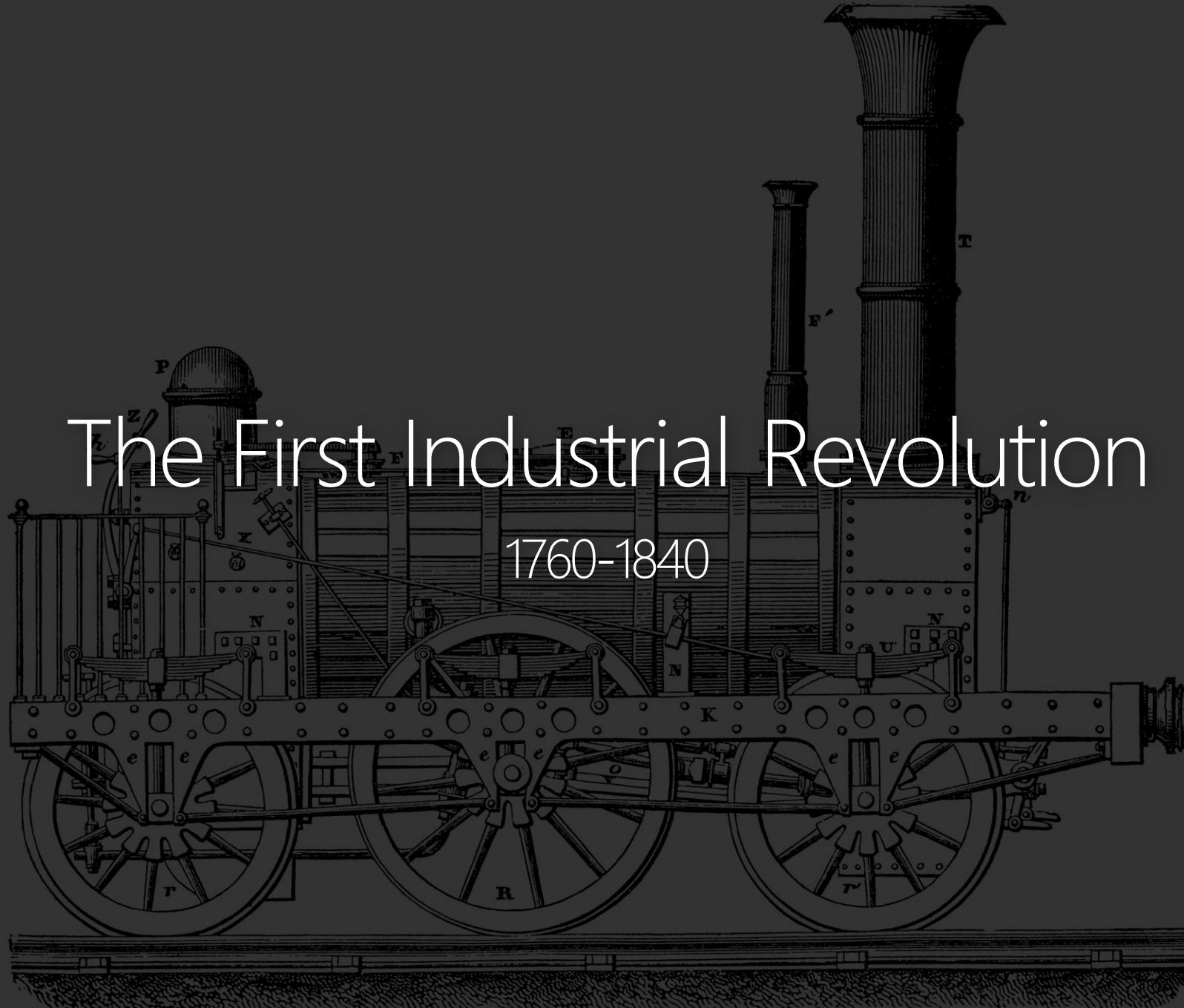
Our Mission

A close-up photograph of a young girl with dark hair, smiling broadly. She is wearing a purple long-sleeved shirt. A pencil is tucked behind her ear. The background is blurred, showing what appears to be a classroom setting with yellow and green walls.

Empower every student
on the planet to achieve more.

The First Industrial Revolution

1760-1840







The Second Industrial Revolution

1870 - 1940



inental CIGAR
TEN CENTS





The Third Industrial Revolution

1960 - 2015





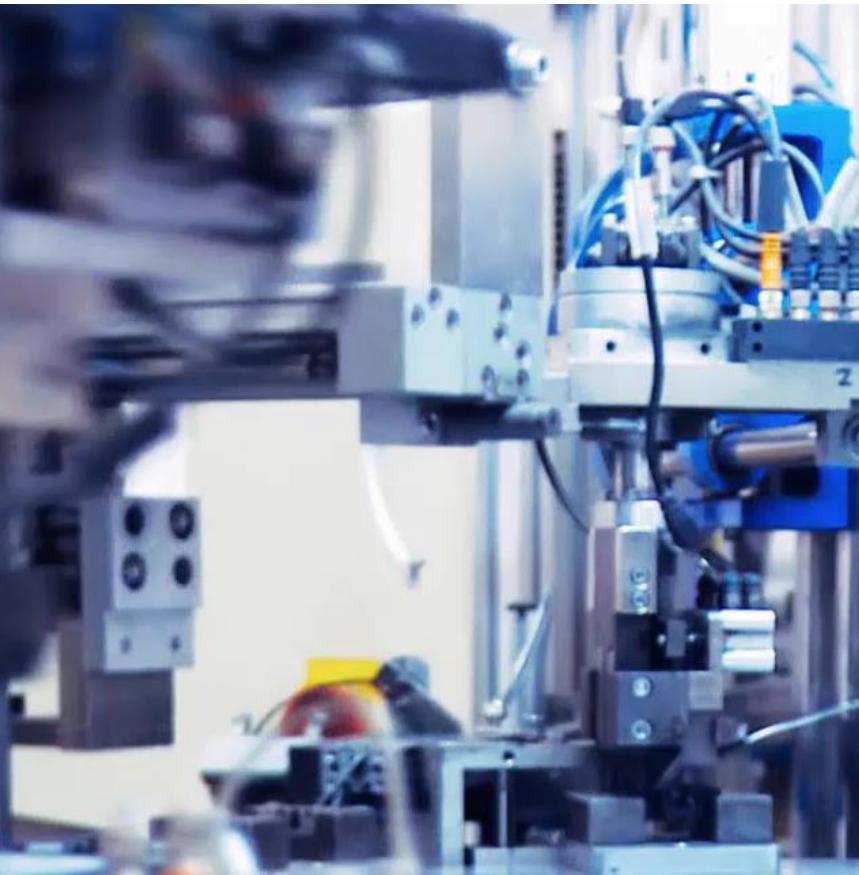
The next
Industrial Revolution



The Fourth Industrial Revolution

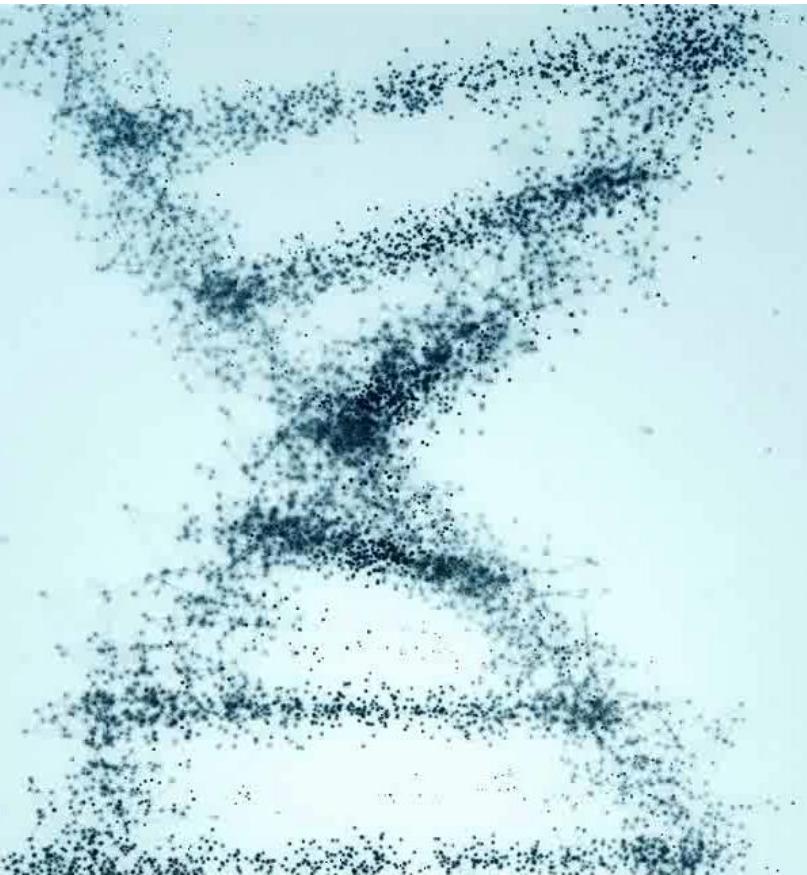
Physical

Autonomous vehicles, robotics,
3D printing, new materials



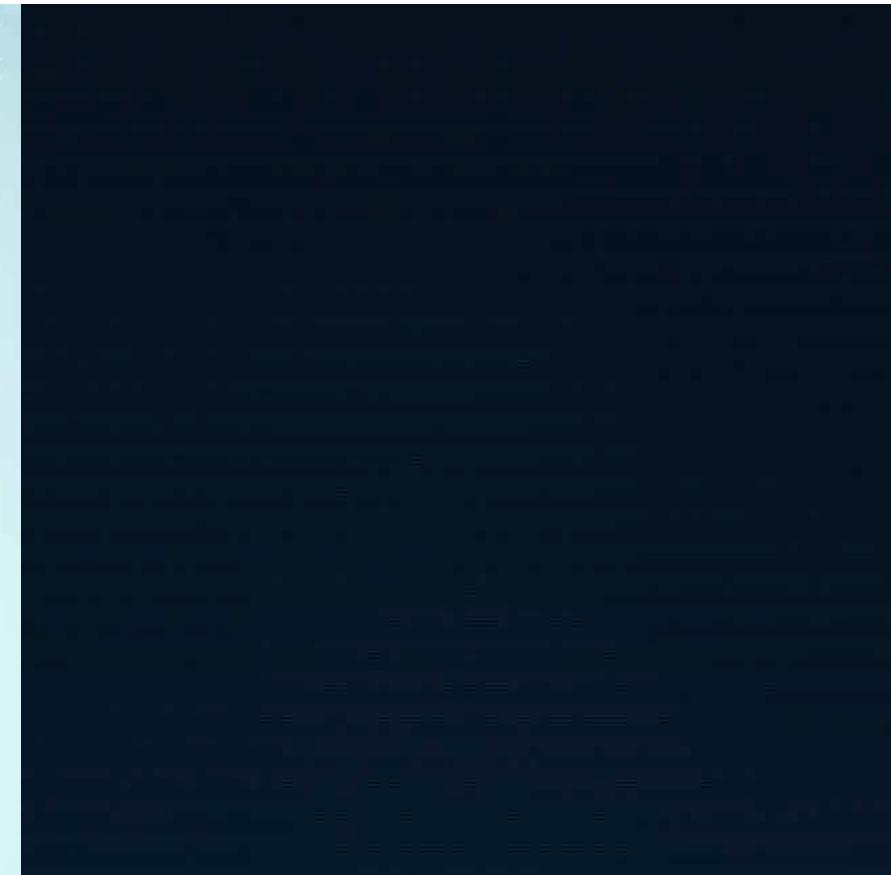
Biological

Genetic diagnostics,
treatment, engineering



Digital

IoT, Blockchain,
disruptive business models



Fourth industrial revolution

**All powered by
technology and
the cloud**



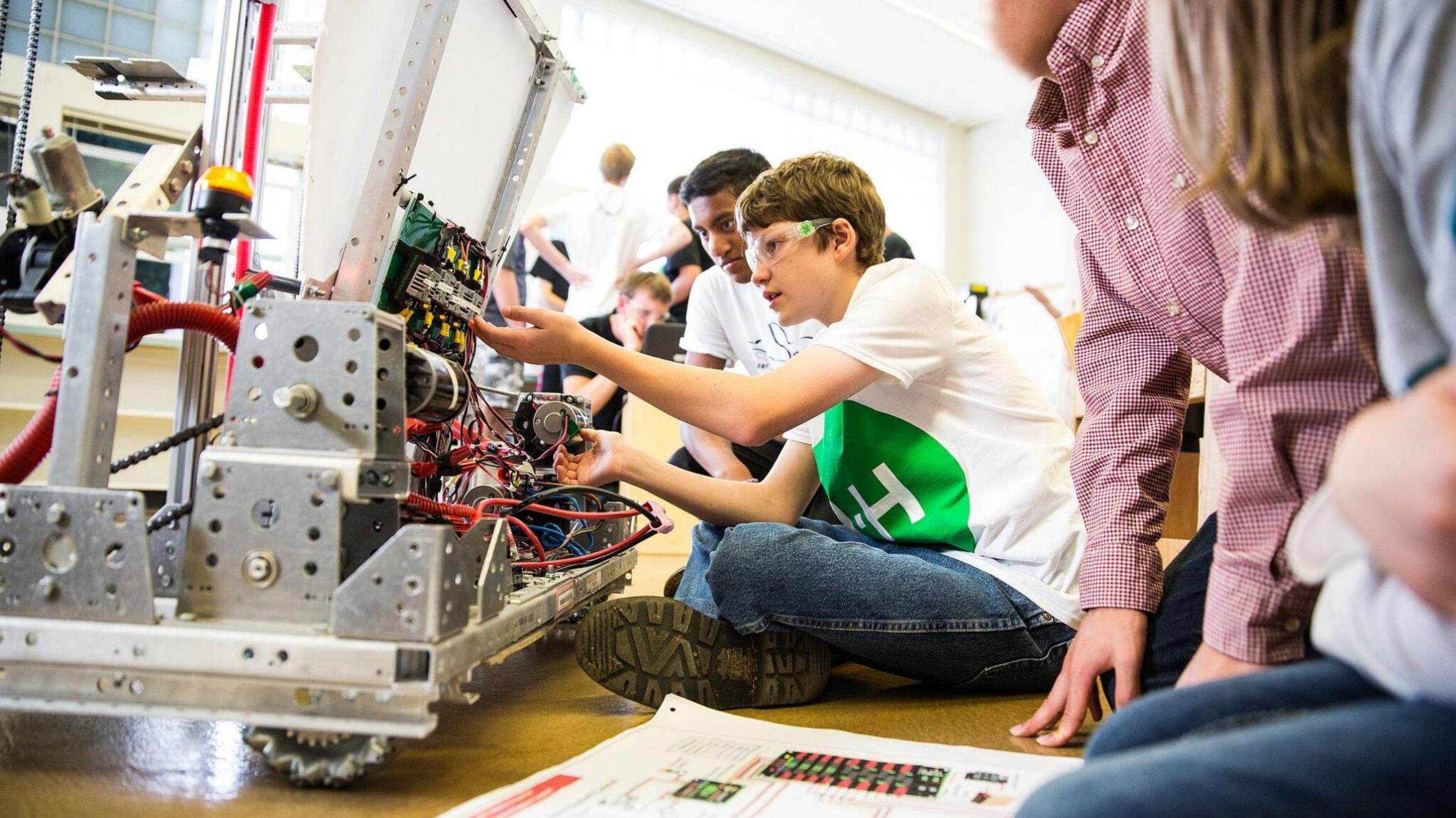
Manufacturing



Have a fucking concept. Learn to take some fucking criticism. Make me fucking care. Use fucking spell check. Do your fucking research. Sketch me fucking ideas. The problem is... Think about...

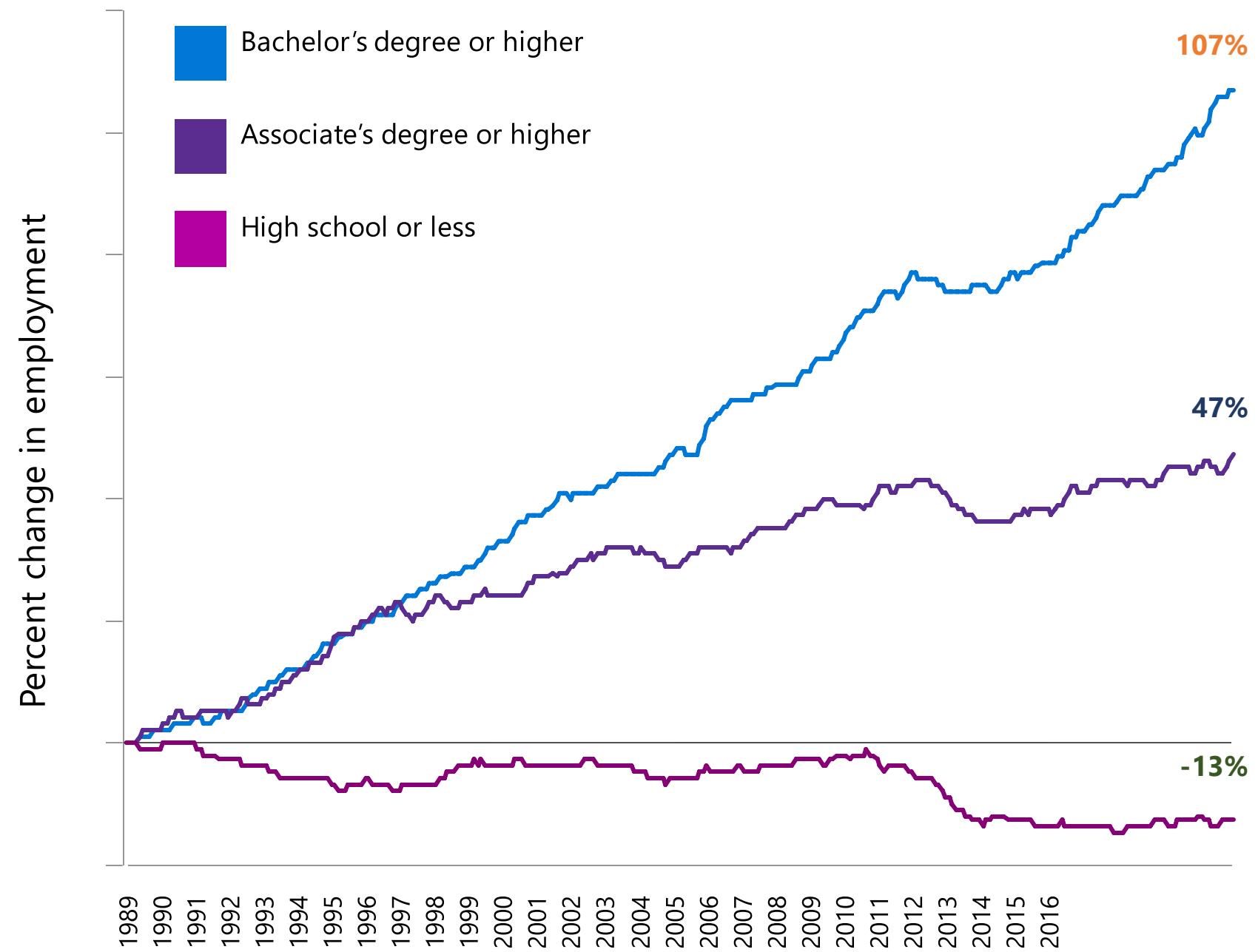








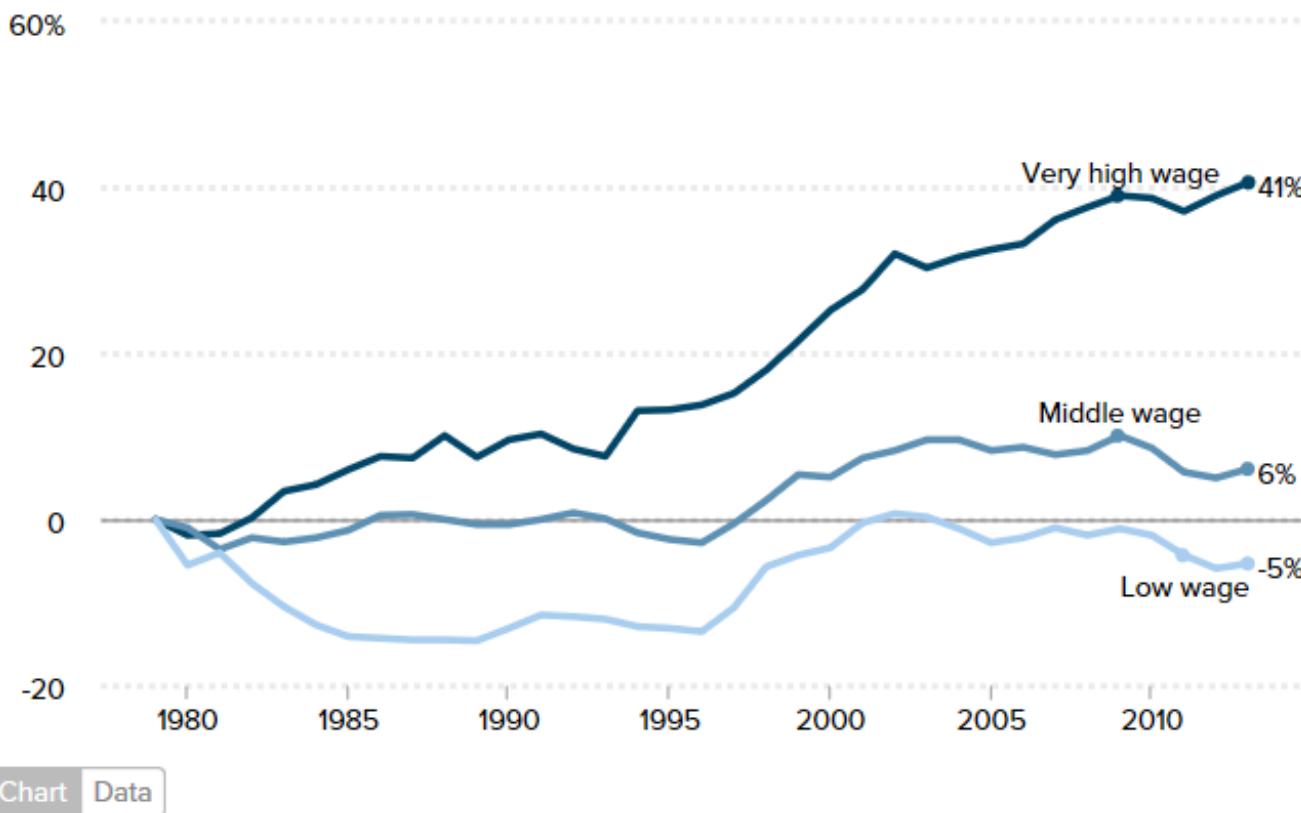
Job Growth in the U.S. Economy



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



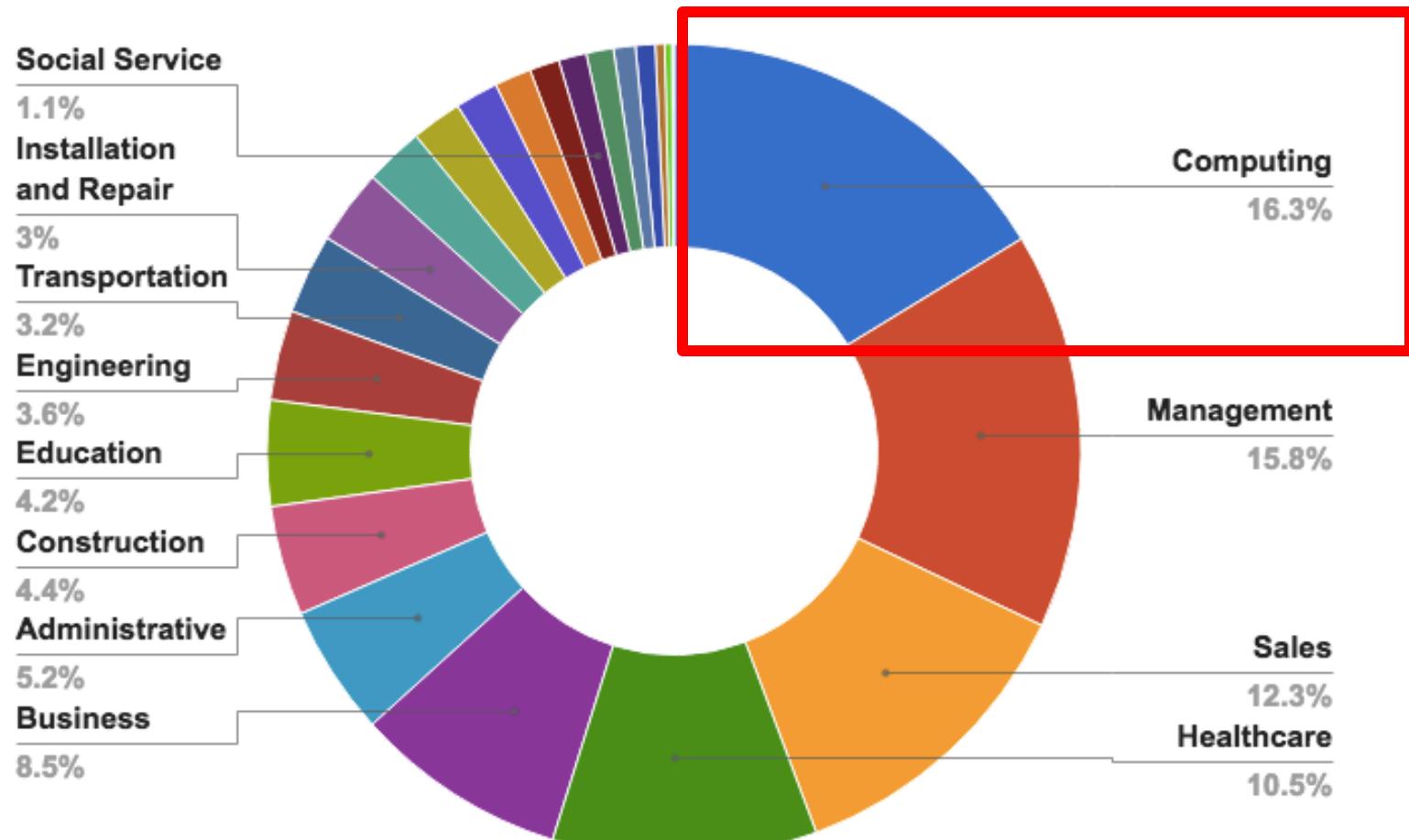
* Low wage is 10th percentile, middle wage is 50th percentile, very high wage is 95th percentile.

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

Where are the
jobs?

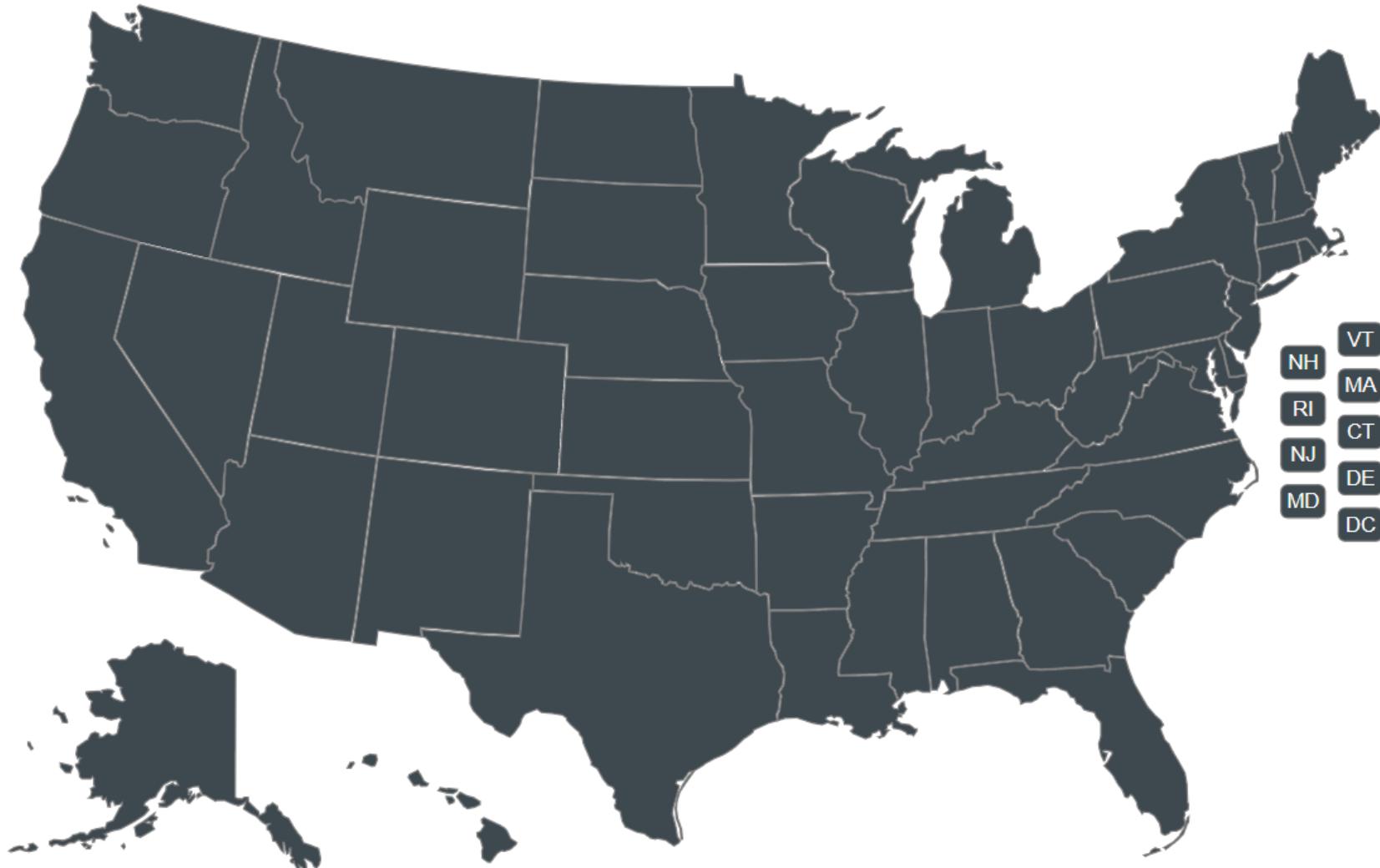


Computing jobs are the #1 source of new wages in the United States



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

Choose a State

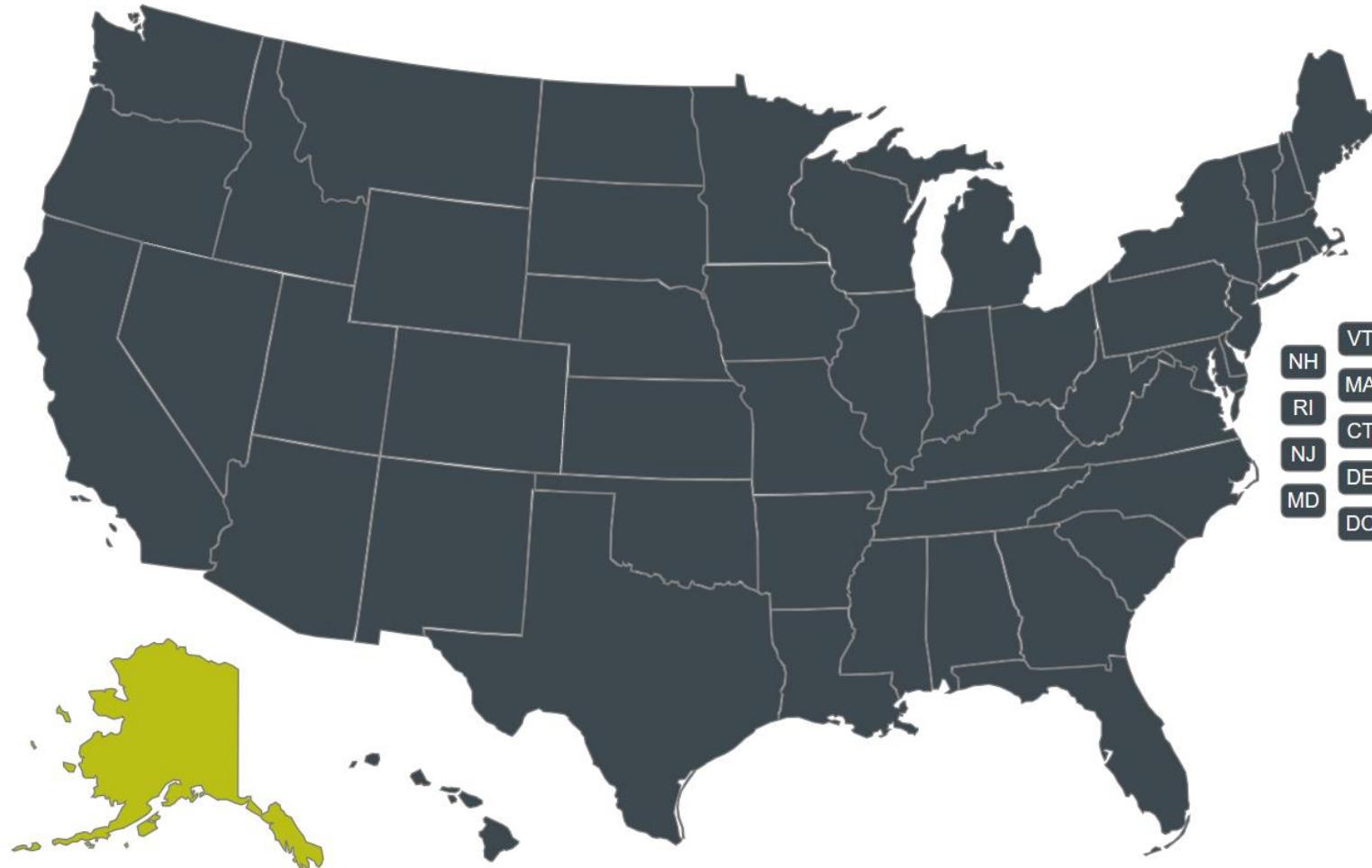


Computer science drives innovation throughout the US economy, but it remains marginalized throughout K-12 education.

- 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

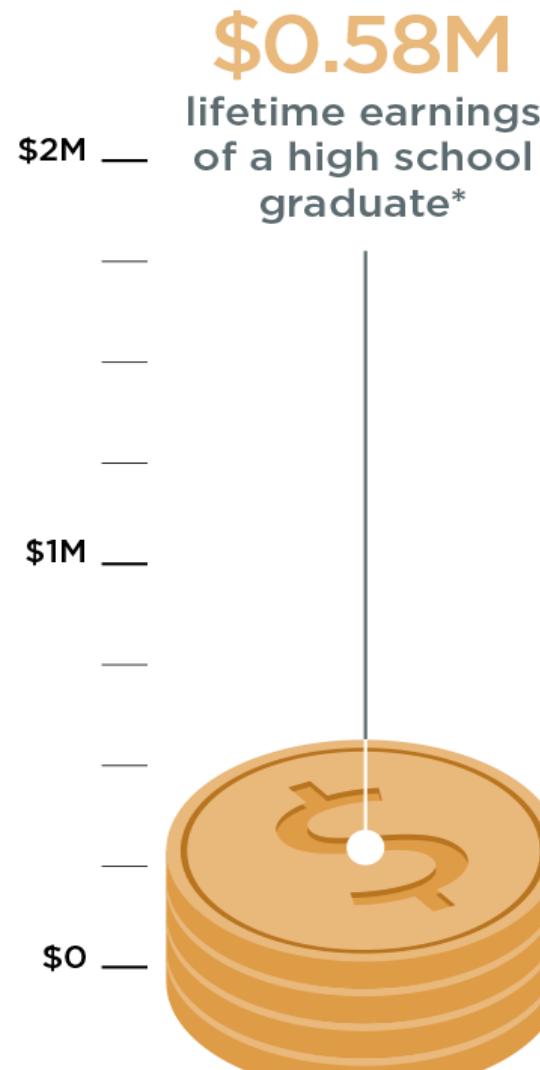
25% of them were female

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



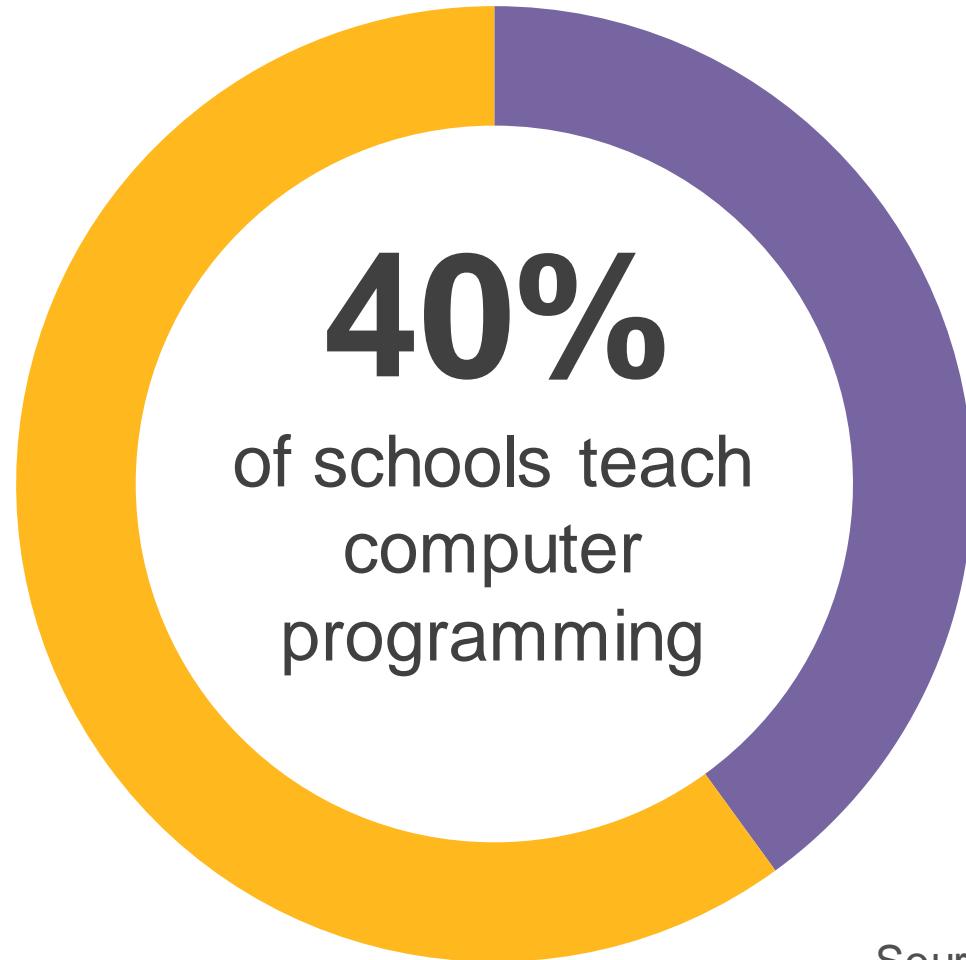
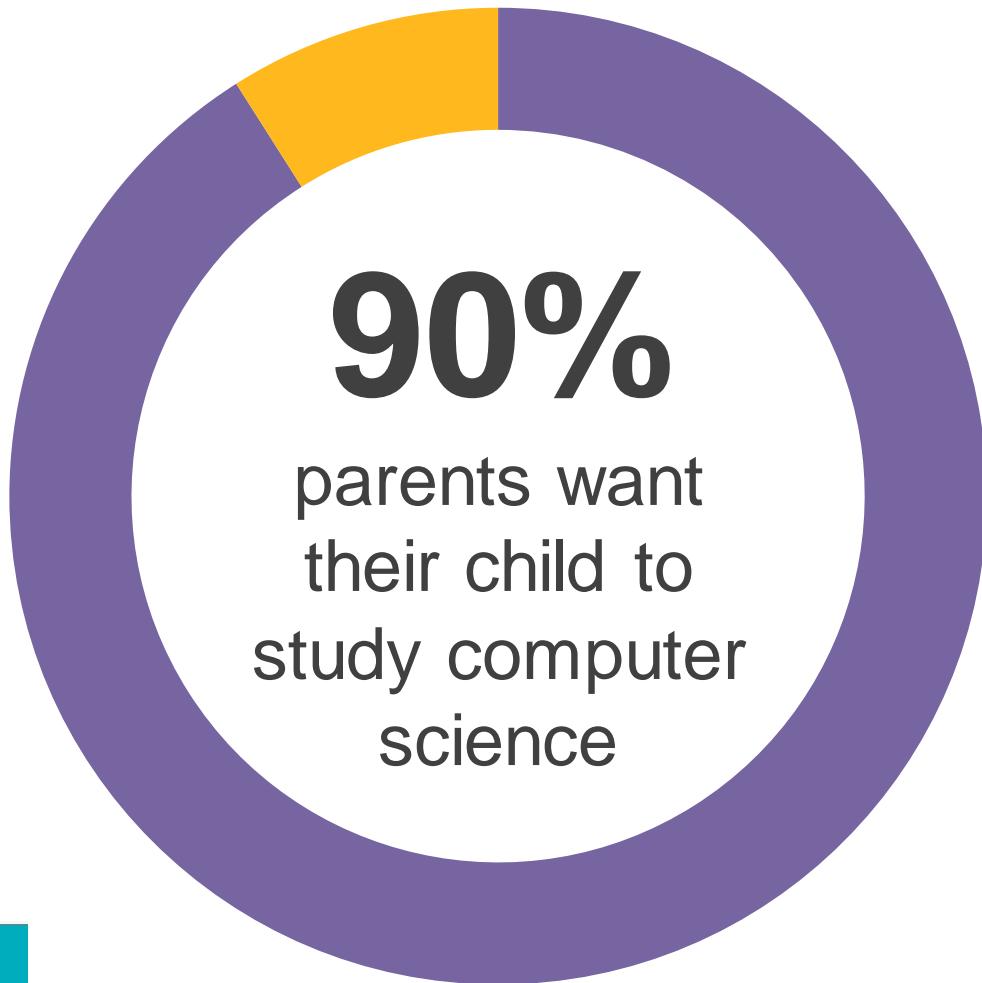
*Net present value today

Source: Brookings

The Gap CS Jobs & CS graduates



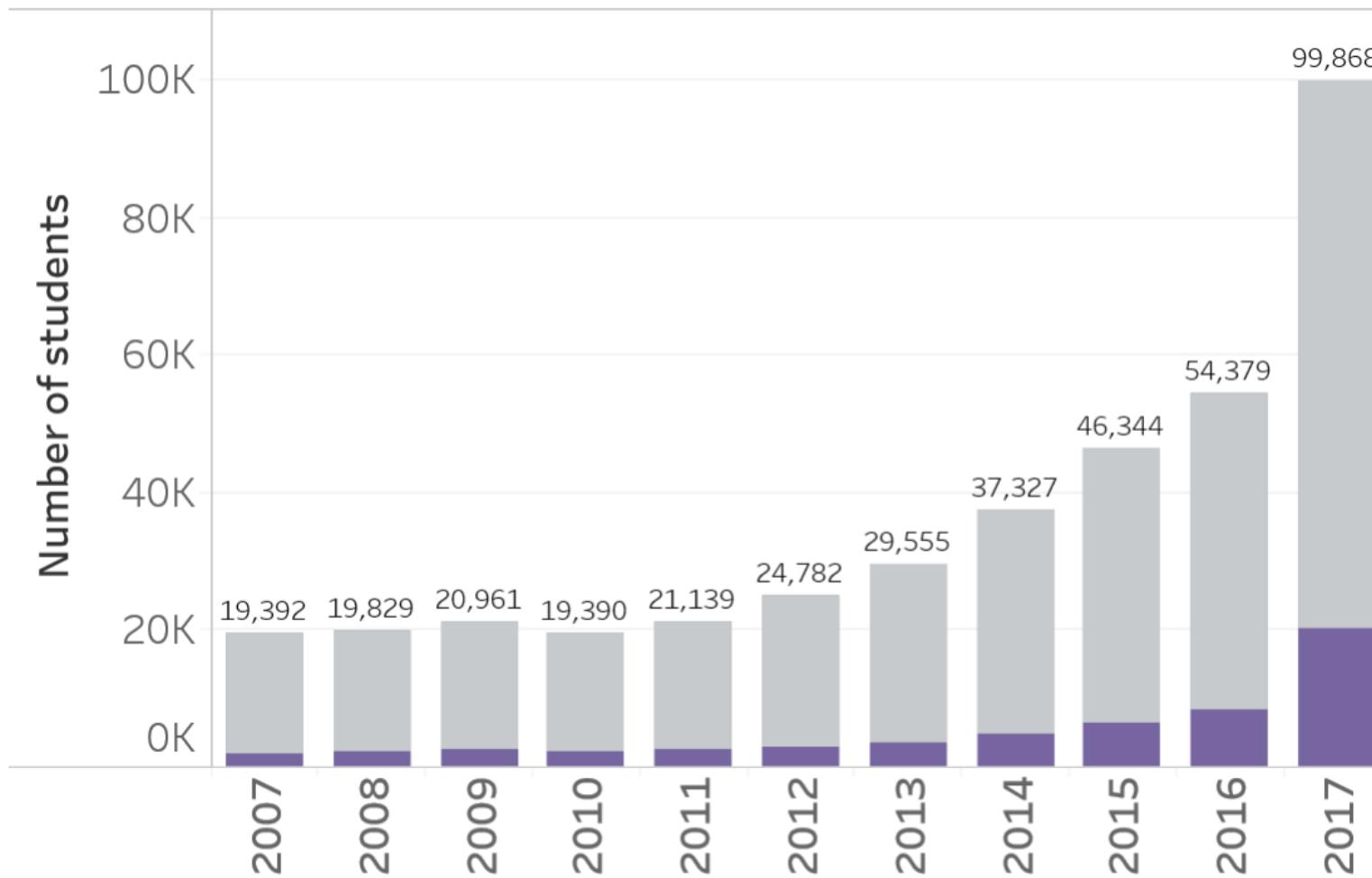
The majority of schools don't teach **computer science**



Source: Gallup

AP Computer Science exam participation by minority status

State: All

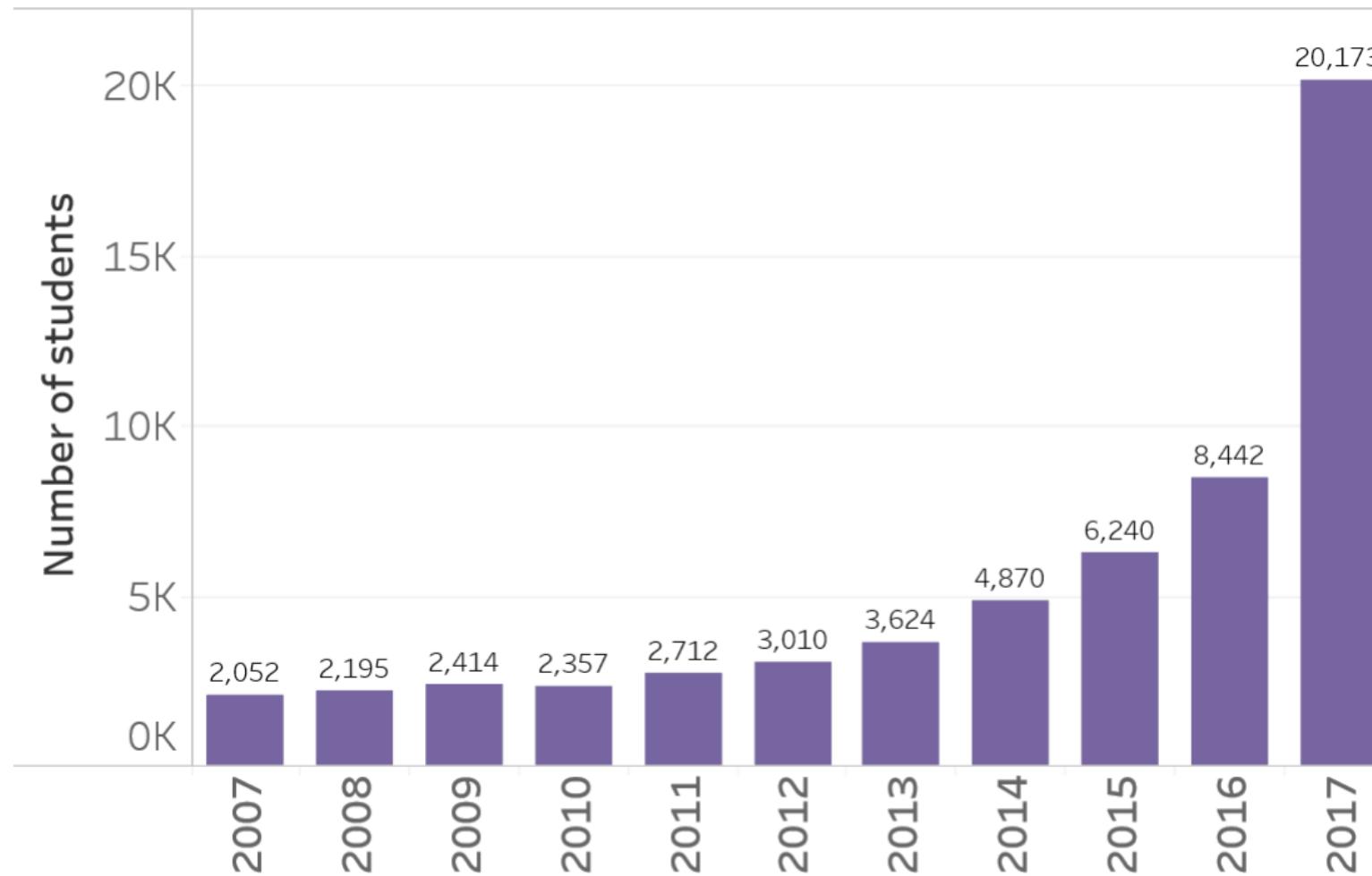


Note: the Computer Science AB exam was offered through 2009, and the Computer Science Principles exam was offered for the first time in 2017.

■ Non-URM
■ Underrepresented minority (URM)

AP Computer Science exam participation by minority status

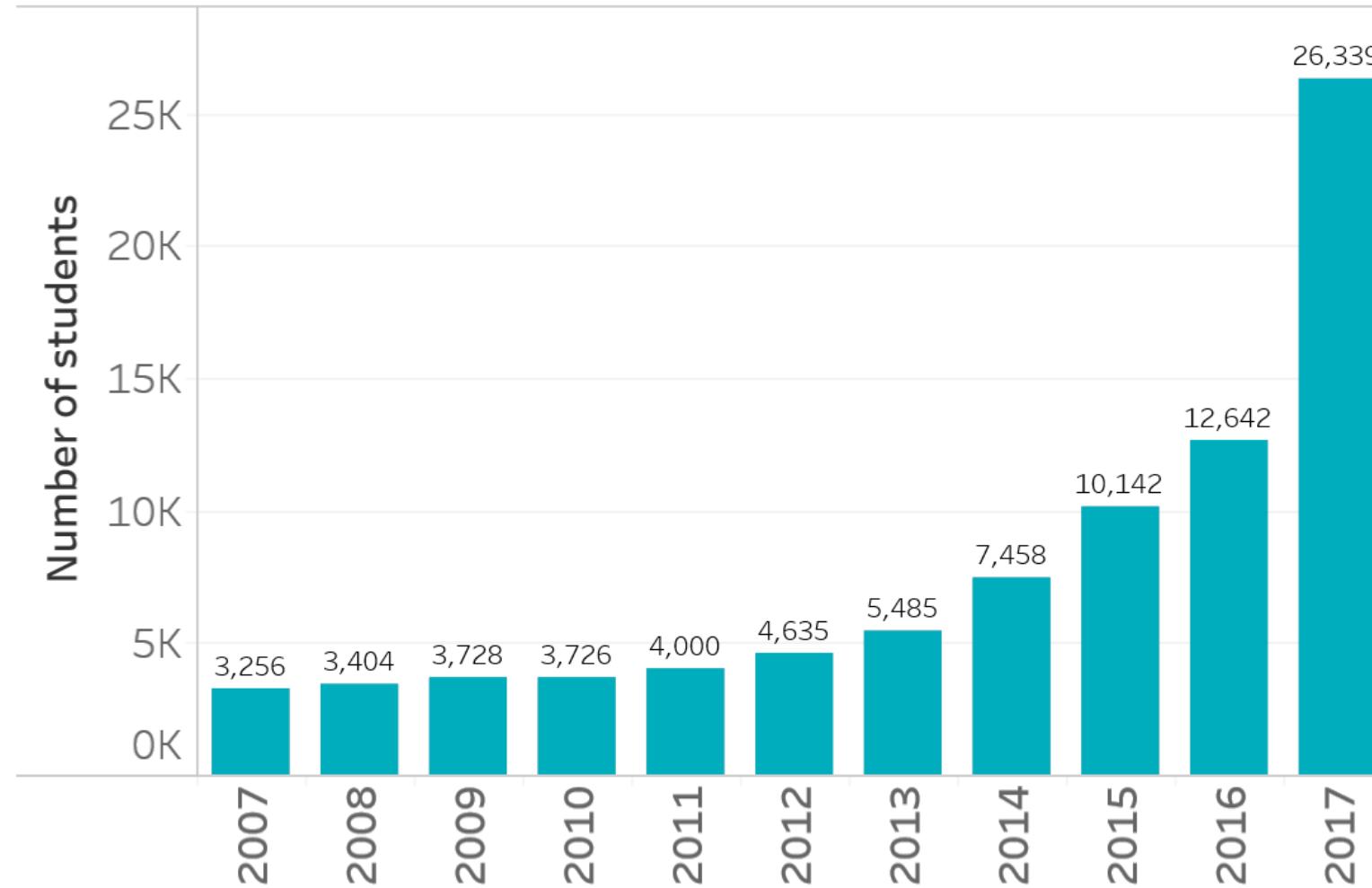
State: All



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

AP Computer Science exam participation by gender

State: All

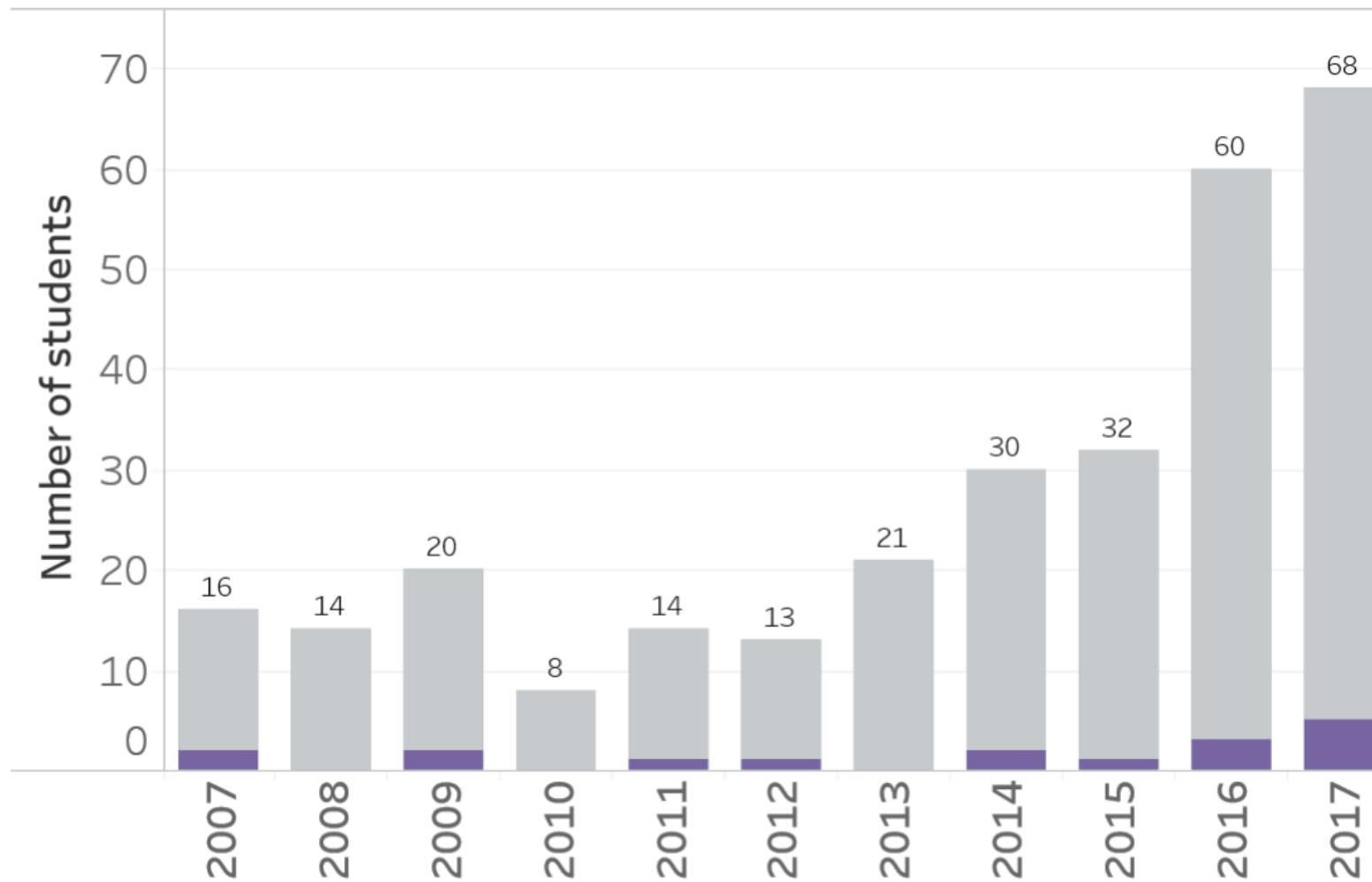


Note: the Computer Science AB exam was offered through 2009, and the Computer Science Principles exam was offered for the first time in 2017.

Female

AP Computer Science exam participation by minority status

State: Alaska

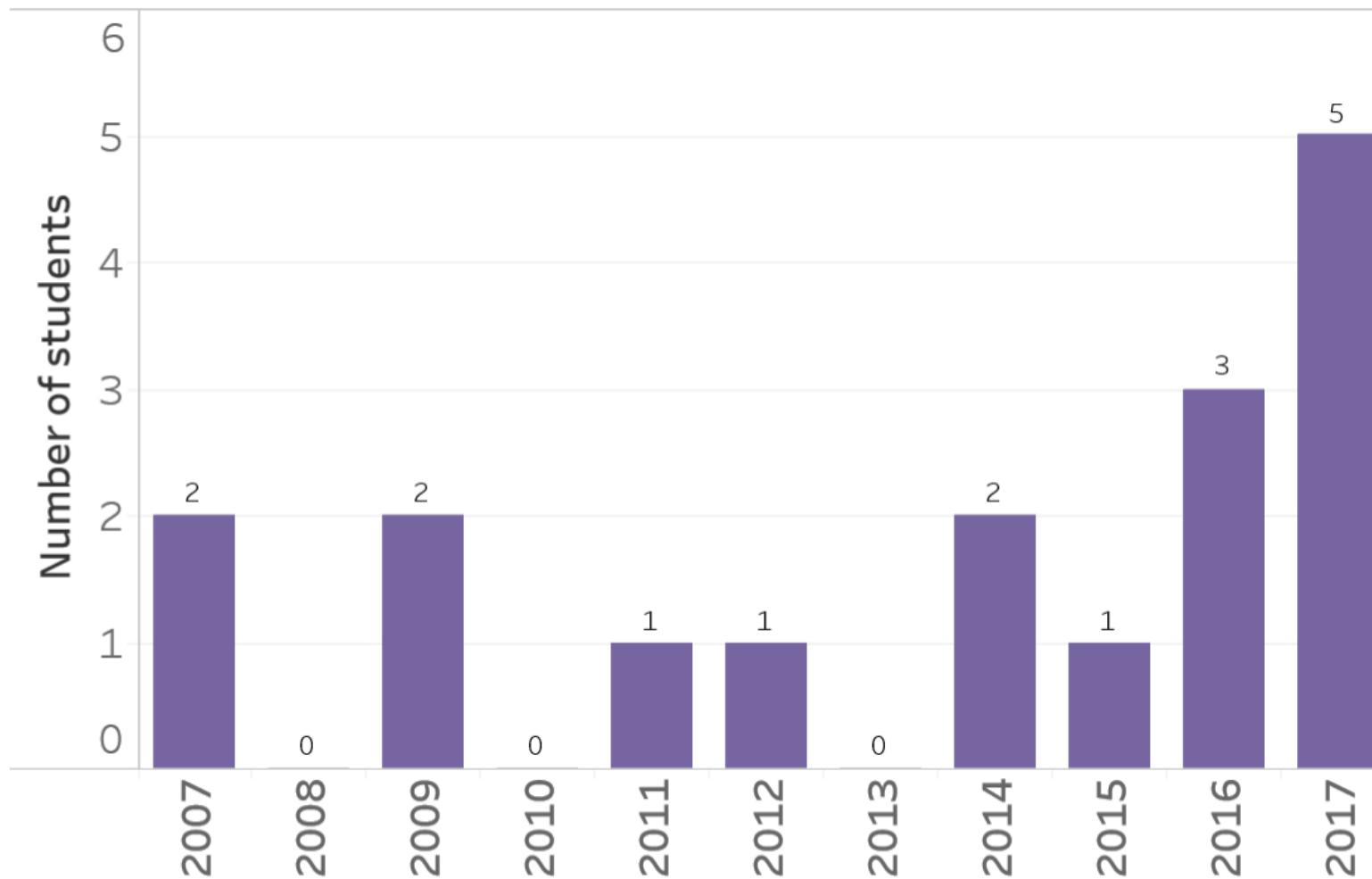


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■ Non-URM
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AP Computer Science exam participation by minority status

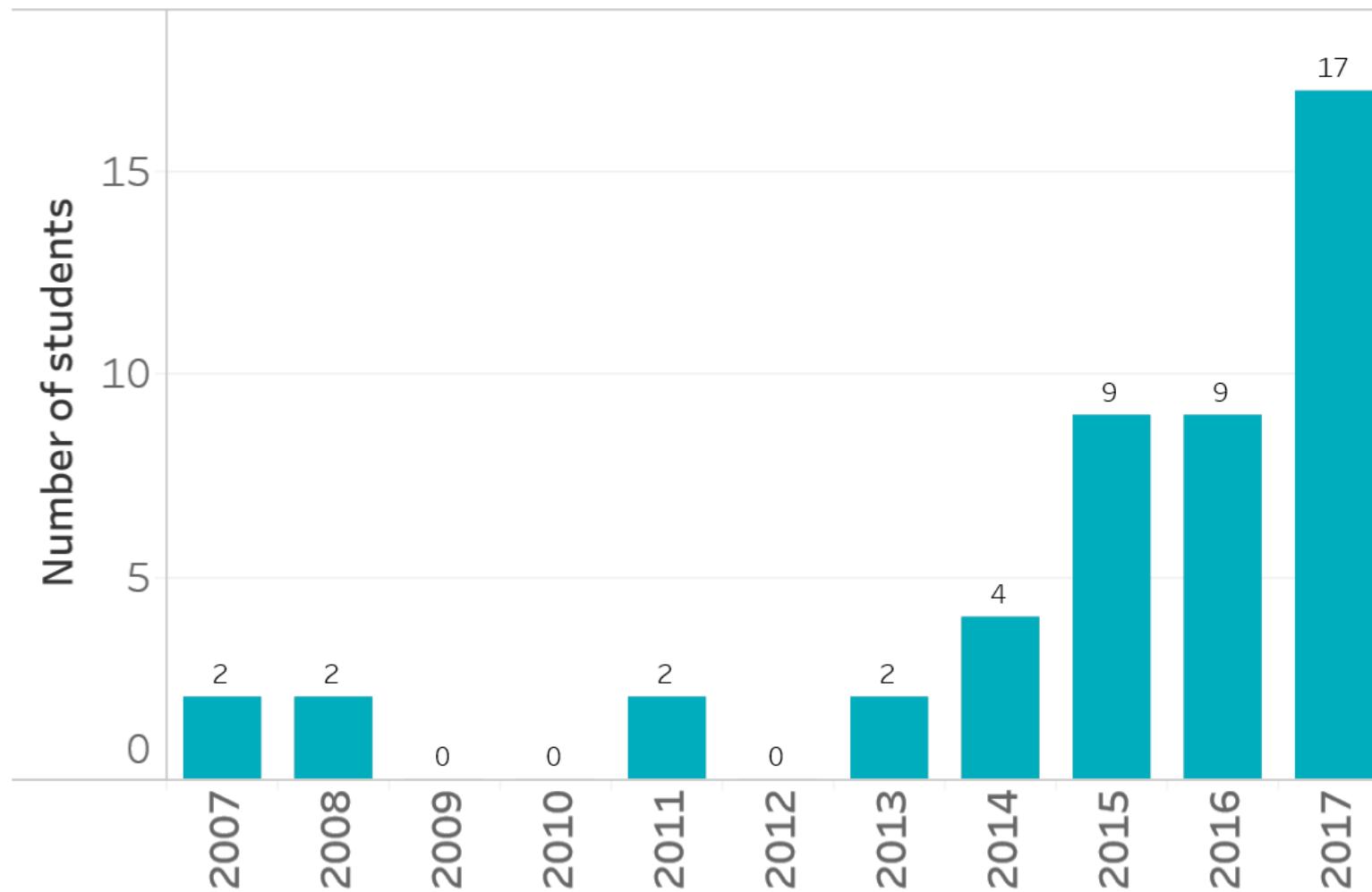
State: Alaska



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

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.

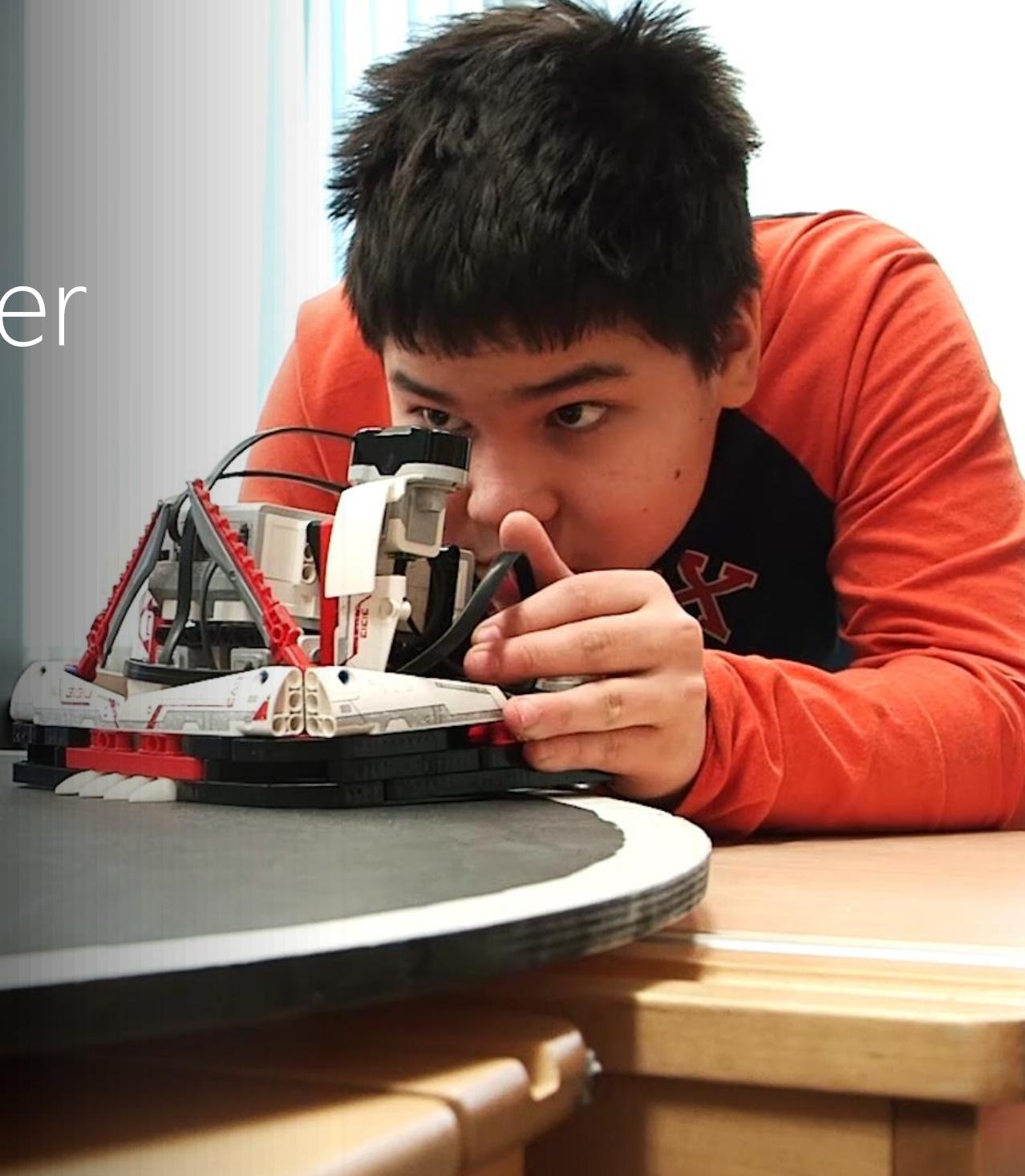
Female

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



Closing the Computer Science Gap

What can you do?

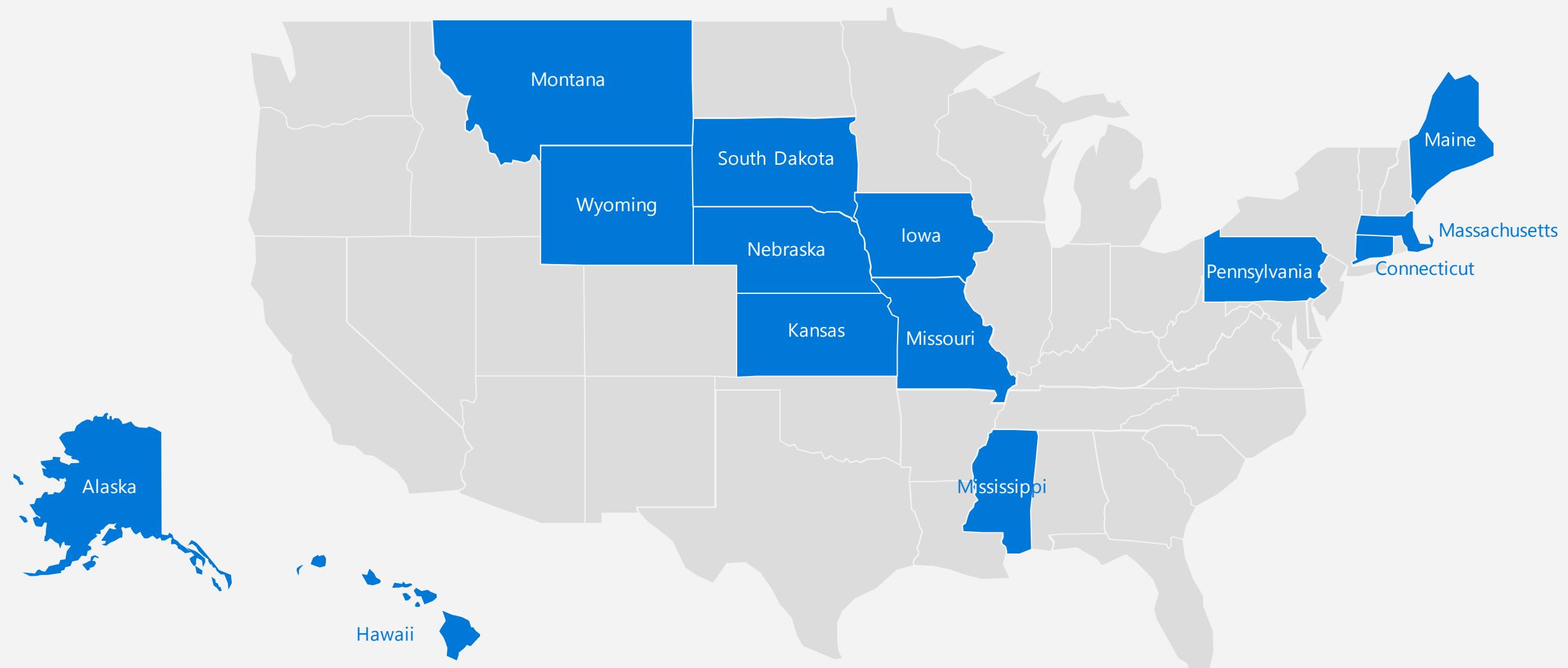


Make Computer Science Count

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

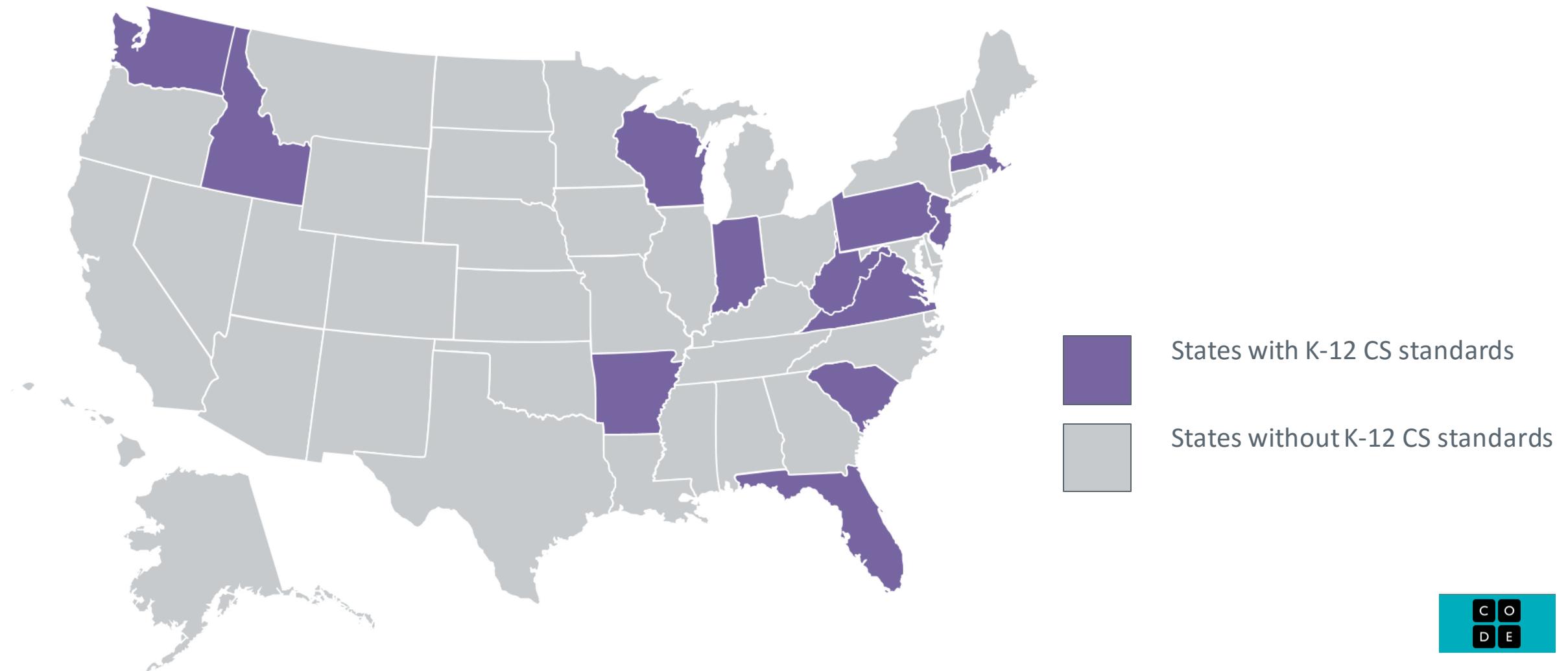


Create Computer Science Standards



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





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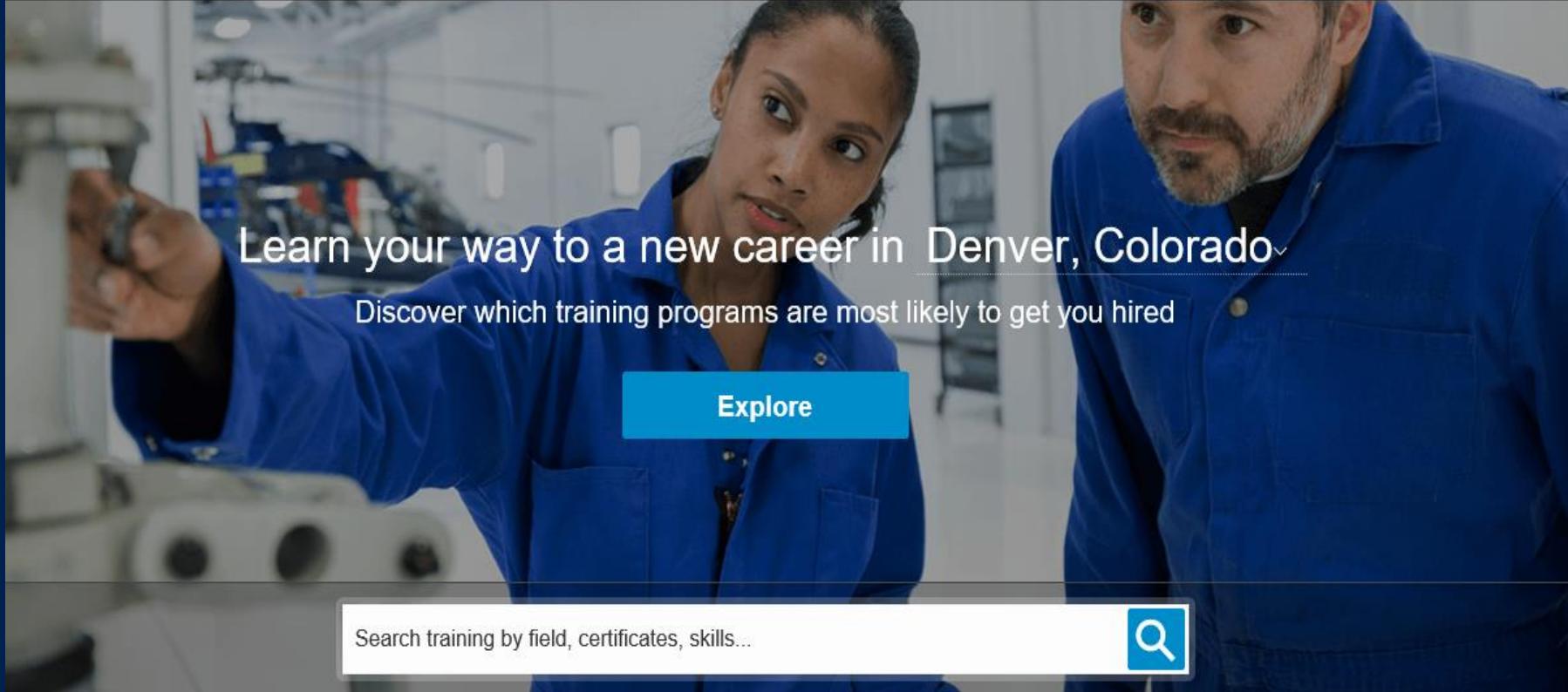


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Healthcare & Wellness



Manufacturing, Architecture & Engineering



THE ECONOMIC GRAPH



Microsoft Software & Systems Academy



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



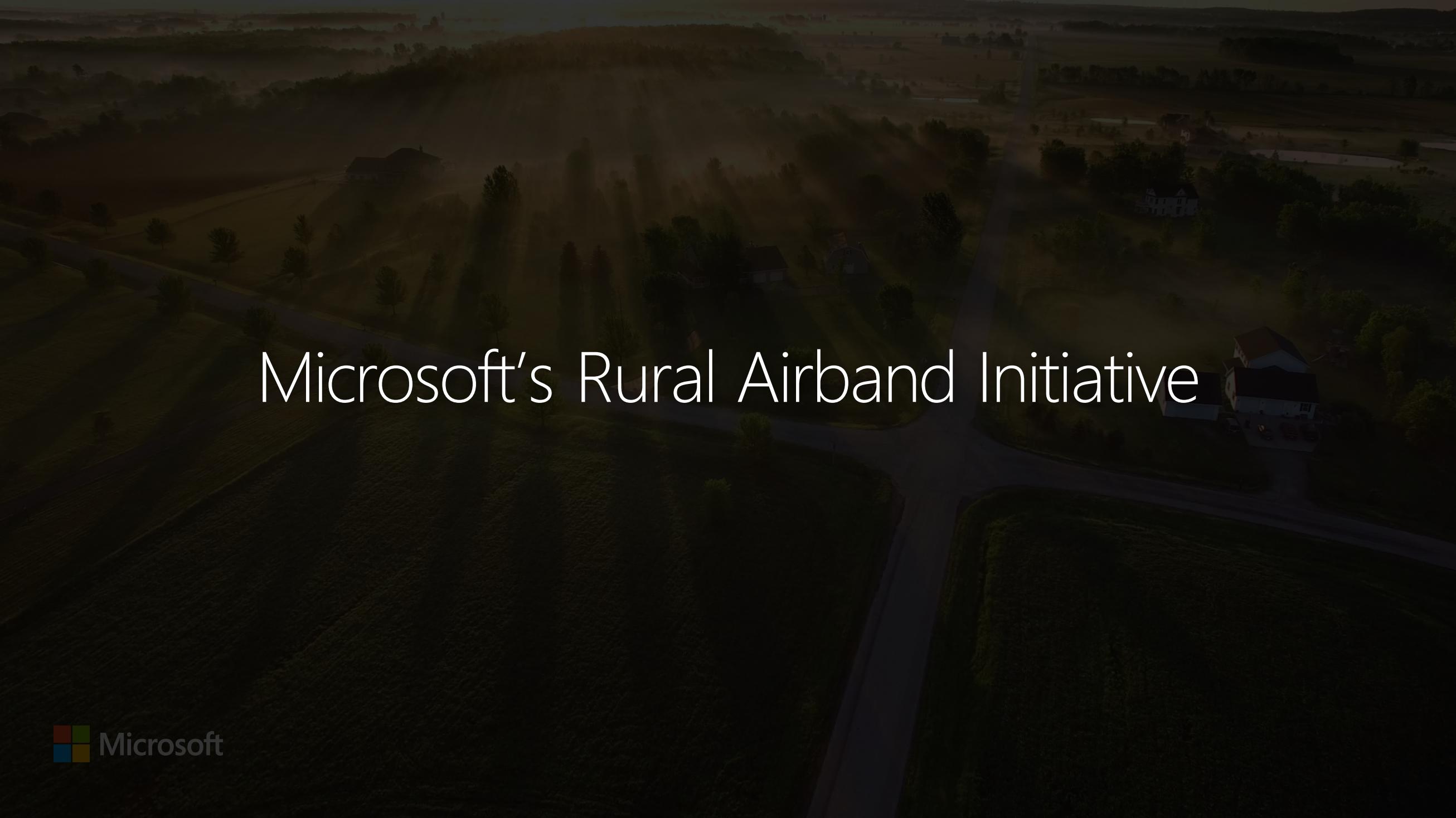
Database & Business Intelligence Administration

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



Microsoft's Rural Airband Initiative

34 million Americans
don't have access
to broadband



23.4 million reside
in rural communities



A clear **goal**

An aerial photograph of a rural area during sunrise or sunset. The scene is bathed in a warm, golden light that filters through the misty air, creating a hazy atmosphere over the fields and roads. A paved road cuts through the center of the image, leading towards a cluster of houses and barns. The surrounding land is a mix of green fields and clusters of trees. In the distance, more roads and fields are visible under the soft light.

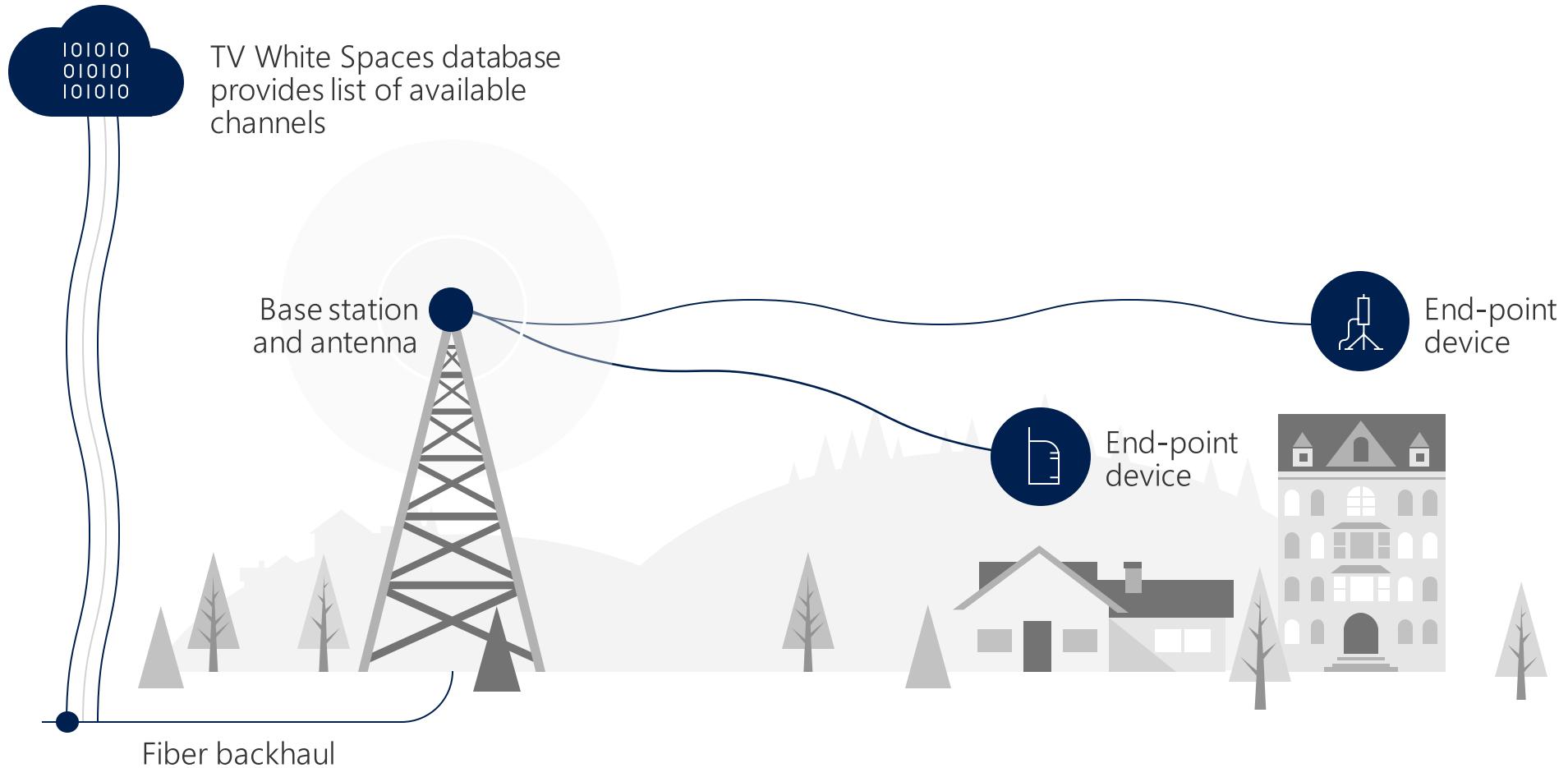
Close the rural
broadband gap in 5 years

July 4, 2022

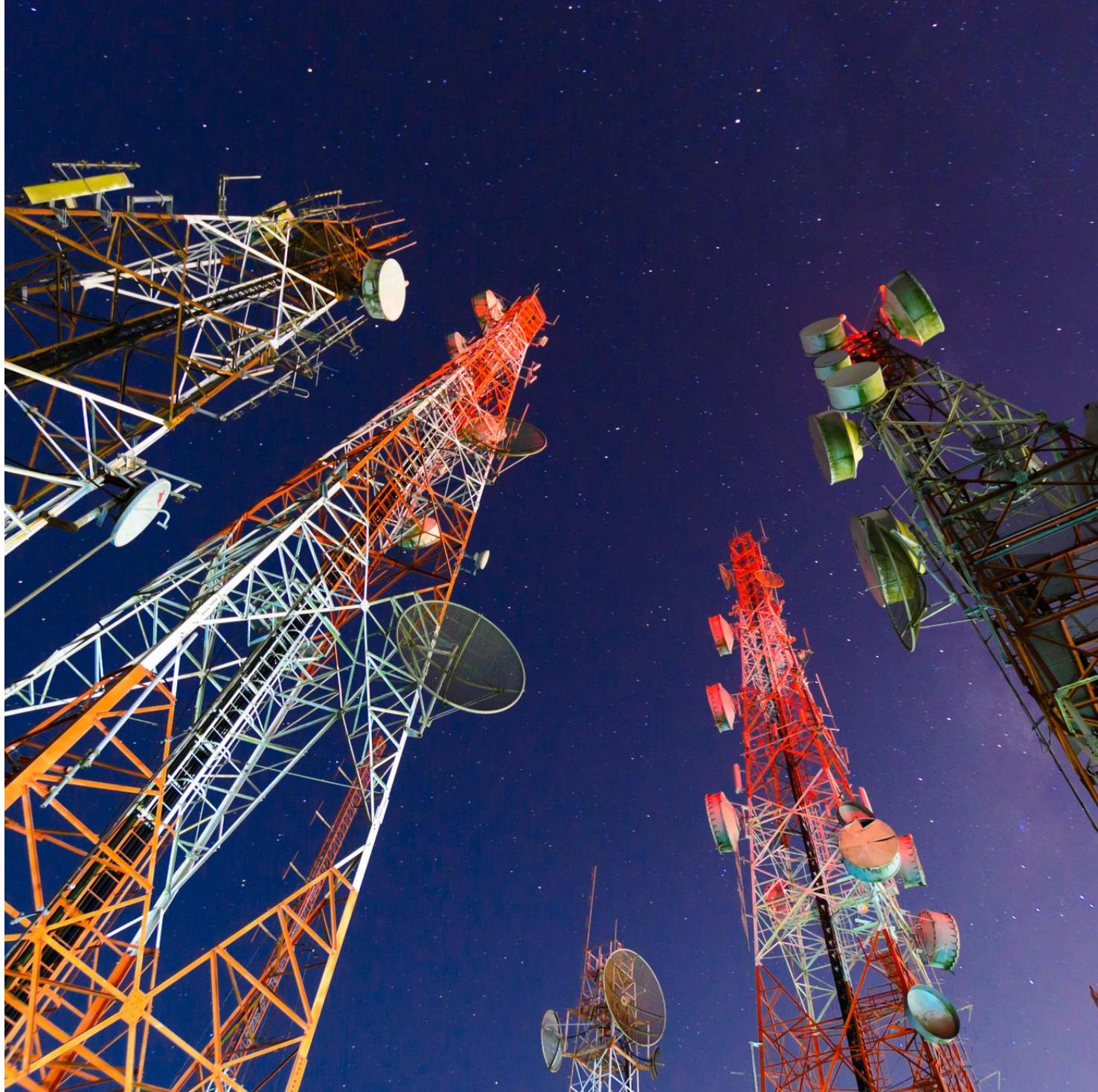
Using vacant channels
on the **TV spectrum**



How **TV White Spaces** works



Deploy a new
mixture of technologies

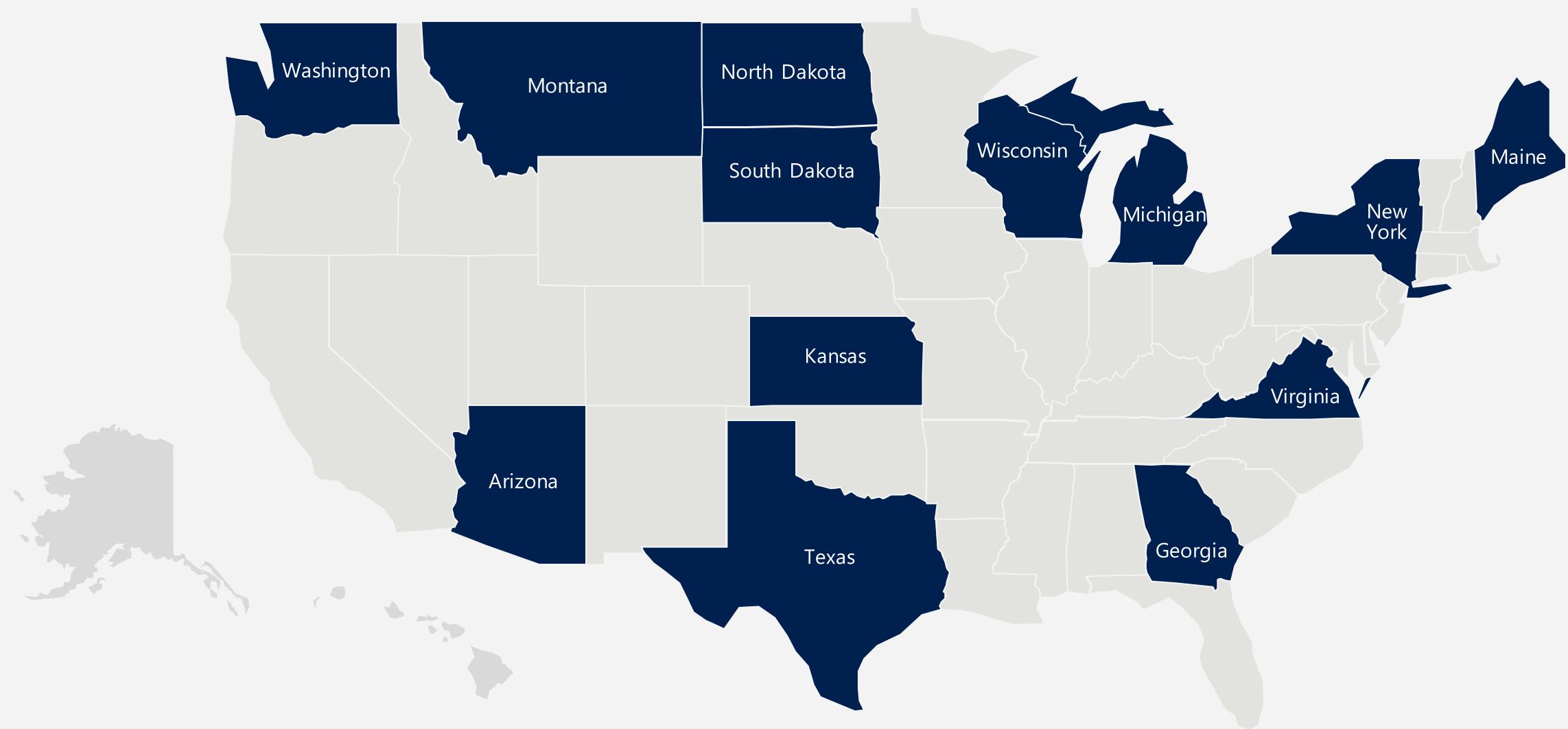


Microsoft's Rural **Airband** Initiative

An aerial photograph of a rural area during sunset. The landscape is filled with rolling green hills, scattered trees, and a network of roads. Several houses are visible, including a prominent two-story house with a red roof on the right and a cluster of buildings with a barn in the center-left. The warm, golden light of the setting sun creates long shadows and highlights the textures of the fields and roads.

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

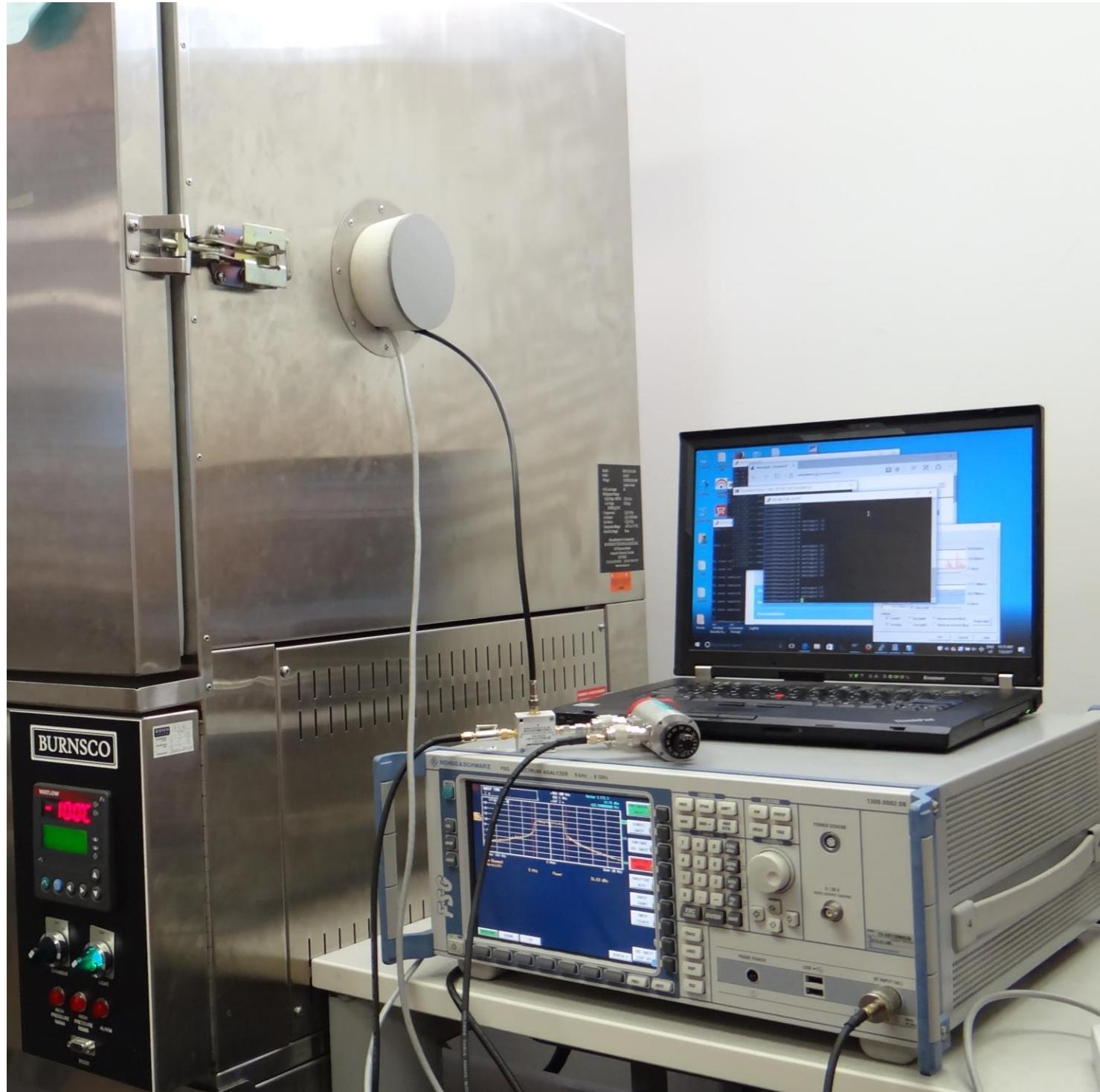
Microsoft Airband projects across the country



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



Stimulate market
by **licensing**
our technology



A young boy with dark hair, seen from the back, is sitting on a floor made of blue and white square tiles. He is wearing a green and blue striped long-sleeved shirt, dark grey pants, and brown shoes with orange accents. He is holding a black tablet device in his lap, looking at the screen which displays a colorful grid of icons. A yellow and red wristband is visible on his left wrist. The floor has a distinct wavy pattern.

Questions?