

DISCOURSE ECONOMY

The chip industry's false promise

America is spending \$52 billion to counter China's edge in semiconductor chips. So where are all the jobs?



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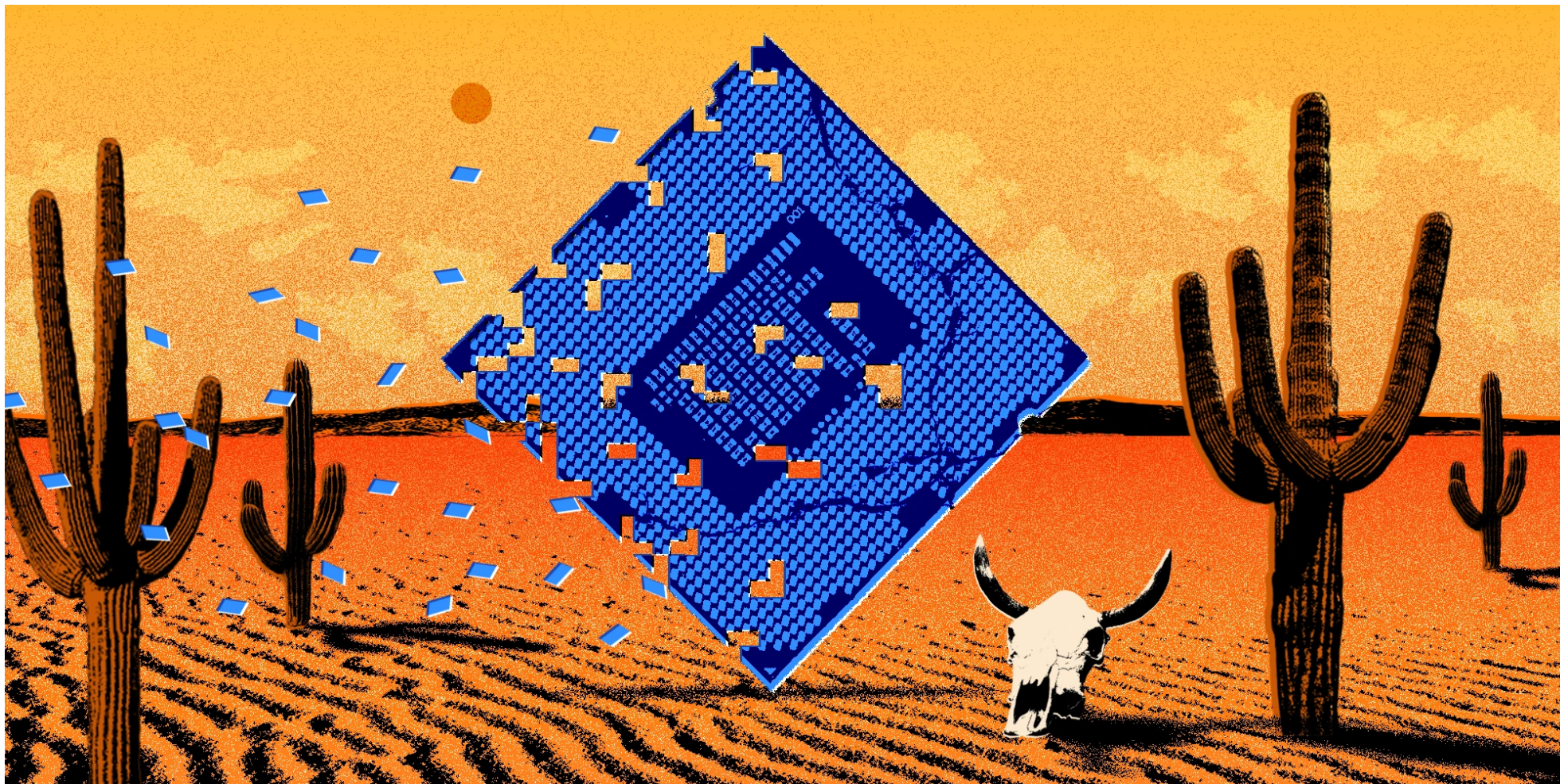


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Semiconductor chip companies are racing to train workers for the jobs of the future. But many have been slow to hire new trainees.

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Jacob Zinkula

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When I met Collin Gardner in September, he was tired of working at Taco Bell. He started working at the fast-food chain in college as a way to make some money while working toward his degree in psychology. After graduating in May, he said he struggled to find a job in the field because most required a master's degree. The 22-year-old needed a gig that could help him launch a career, or at least one with better pay.

Thankfully, Gardner came across a YouTube ad for the Quick Start program, a partnership between major semiconductor companies and three community colleges in Arizona's Maricopa County that promised to train people to become semiconductor-processing technicians — frontline workers who help make the chips that power everything from iPhones and washing machines to pickup trucks and military equipment. The program, one of the first of its kind, has laid the foundation for similar initiatives across the country.

The 10-day program seemed like a perfect fit for Gardner: It was local, it was relatively short, and it seemed to be a promising first

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step toward a career in Arizona's industry of the future.

"I applied because I thought it was a simple, inexpensive certification that would get me a job somewhat immediately working in the industry, hoping that I would enjoy the work and get at least better pay than Taco Bell," he said midway through the program in late September.

But since completing Quick Start, Gardner has come to a worrying realization: There aren't enough semiconductor jobs to go around. After I spent time in Arizona, it was clear to me just how much economic conditions, construction slowdowns, and the slow distribution of government funds had dampened the near-term enthusiasm around the promised semiconductor job boom. Quick Start is just one program, but its connections to major companies and its advantageous location in Arizona — the future home of America's semiconductor industry — mean that outcomes for its graduates are a useful bellwether for the US's massive investment in chipmaking.

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Sure, roles are expected to materialize in the years to come. But being trained for a job of the future doesn't do you much good when

the future isn't here yet.

Not according to plan

Semiconductors have become a critical technology, which is a serious problem for the US since just 12% of all chips are produced domestically and the pandemic proved any disruption to the supply chain can have significant consequences for our economy. Add in the fact that the world's leading chipmaker, Taiwan's TSMC, is precariously close to China — a geopolitical rival that has made more noise in recent years about invading the island — and it's no wonder that the US government is rushing to bring the industry to its shores.

The American semiconductor rush kicked into high gear in 2022 when President Joe Biden signed the CHIPS Act into law, which included \$52 billion in subsidies designed to bring more chipmaking to the US. Much of the funding is expected to flow to Arizona, which has a history of semiconductor manufacturing.

But despite these positive developments, industry leaders issued a dire warning: There weren't enough American workers to fill their

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planned factories. Semiconductor manufacturing requires a phalanx of technicians, computer scientists, and engineers with technical training to produce the highly delicate technology. Given the pace with which people are joining the industry, a July study by the Semiconductor Industry Association in partnership with Oxford Economics estimated that the US would have a shortfall of nearly 70,000 semiconductor workers by 2030.

That's where programs like Quick Start come in.

With the backing of major industry players, including TSMC and Intel, Quick Start kicked off in July 2022. The program costs just over \$300, all told, and graduates of the 10-week course receive a semiconductor pre-apprentice credential, which can be used to land jobs in the industry, typically in semiconductor-technician roles. Entry-level technicians can expect to earn roughly \$30 an hour, depending on experience, and there are chances for advancement.

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"I'm constantly learning and I'm constantly in training here," Lisa Strothers, a 2022 Quick Start graduate who landed a job at Intel, told me last year.

Quick Start students spend 10 days preparing for a career in the semiconductor industry. Jacob Zinkula

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When I spoke with program leaders, they said that in some ways, Quick Start had been a resounding success: 3,000 people have passed the program's online pretest, which was temporarily closed in March because of excess demand before being reopened in September. Nearly 900 students had enrolled in the program and

over 700 have successfully completed it, with roughly 300 on a waitlist. Nearly two-thirds of students have been people of color, and half have been first-generation college students.

Despite this success, and the supposed need for more semiconductor workers, Quick Start's graduates are facing a growing problem: There aren't jobs for many of them.

Due in part to slowing demand for their tech, the same semiconductor companies that have been outspoken about the need for people with industry experience have scaled back their near-term hiring and even laid off some workers, leaving programs such as Quick Start with a glut of graduates who have few paths to employment in the industry.



were literally frozen when I asked what their hiring needs in the future looked like.

Leah Palmer, executive director for the Arizona Advanced Manufacturing Institute at Mesa Community College

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Of the 240 former Quick Start students who had filled out an employment-outcome form as of June 30, 31% said they had been hired in the industry, while the others said they were either still looking for a job — 58% — or weren't looking, 11%. As for the hundreds of other students, including those who've completed the program in recent months, Quick Start doesn't know what they're up to. The lack of updated data on employment outcomes raises questions about the success of the program.

"Usually, education is trying to catch up to the speed of industry," Leah Palmer, the executive director for the Arizona Advanced Manufacturing Institute at Mesa Community College, told me in late 2023. "What we've done, at least for that entry-level position, is we've created a mechanism that systemized creating outputs greater than the demand can handle."

Each month, Palmer said, she and other representatives from Quick Start meet with roughly 30 people from major semiconductor companies who serve on the program's advisory board. The meetings are used to share updates on the state of the industry and the program, specifically class-completion numbers, curriculum additions, hiring fairs, and funding opportunities. During a

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September meeting, Palmer said the companies were hesitant to provide many details about their plans to grow their workforces.

"They were literally frozen when I asked what their hiring needs in the future looked like," she said. "They couldn't speak to it and wouldn't speak to it. Even Intel and TSMC couldn't give any feedback."

When asked about the company's hiring plans, a TSMC spokesperson said late last year that it had already hired over 2,000 factory workers at its Arizona site and that it planned to eventually staff roughly 4,500. An Intel representative told Business Insider that the company was actively hiring, pointing to its job openings across the US. Gary Burley, a professor for the Quick Start program who's worked at Intel for nearly 20 years, said the recent hiring slowdown wasn't surprising, as the industry was no stranger to hot-and-cold hiring cycles.

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"The history of the semiconductor industry is hire a lot, and then — whoa, whoa," he said. "People have stopped buying it. We need to back off."

The precedent is little solace for the many graduates of the Quick Start program who are stuck in limbo.

Broken promises

People enroll in the Quick Start program with the expectation they'll have the opportunity to network and eventually interview with semiconductor companies — the program's website used to promise as much, though this has since been removed. Early last year, industry job fairs were held on a monthly basis, with candidates having the opportunity to learn about career opportunities and meet recruiters. But these events have dried up — the last job fair was in June, and no others have been scheduled.

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Some Quick Start students have struggled to find jobs in the semiconductor industry after the program. Jacob Zinkula

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Even students who were lucky enough to attend a job fair felt like they were flapping in the wind. A former Quick Start graduate told me that the job fair they attended in April left a lot to be desired. The graduate spoke on condition of anonymity for fear of professional repercussions. Their identity is known to us.

"Basically, what happened was it was, like, 3 1/2 hours of PowerPoints, and then the last 30 minutes, they were like, 'OK, now networking time. Go,'" they said. "There were a million people there, so even the people you wanted to talk to, you had to wait in a line. So it was a bit bungled."

After eventually landing an interview with a major semiconductor company last year, the graduate said they were told that the company's hiring freeze would likely prevent them from moving forward for at least a few months — they've since been told they're no longer being considered for the position.

"It doesn't really feel like, 'Oh, we're dying for people. If you take this program, we'll help you get a good-paying job,'" they said in reference to semiconductor companies. "It's not that simple."

While they eventually found work at the company through a contractor last year, they said they weren't optimistic about their near-term chances at direct employment.

"It's been such a freaking long process, and now I'm actually having doubts whether I'm going to stick it out all the way," they said.

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In addition to no longer promising interviews with semiconductor companies, Quick Start has taken other steps to moderate candidates' expectations. The program's [website](#) now says that hiring with its employment partners has "slowed" and that it doesn't "know when hiring will pick up again." Program leaders hope to learn more about the industry's hiring plans at the next advisory-board meeting in February.

Another problem for the Quick Start program — and perhaps a contributor to graduates' hiring challenges — is the relatively short period of training. In the more difficult hiring environment, some of the chipmakers — including those who helped build the program — have started to question whether the training is sufficient to prepare graduates for jobs in the industry. Gabriela Cruz Thompson, Intel's director of university research collaboration, said late in 2023 that the company was evaluating whether the Quick Start graduates were being set up for success.

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"We are asking ourselves and asking the managers of those people that got hired whether this training is enough, whether it is unfair to them to hire them and then they don't deliver in the job," she said.

If the training is deemed insufficient, Maricopa County may consider adopting something closer to the one-year training program Intel is in the process of rolling out with Ohio community colleges.



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The hiring slowdown, and the reconsideration of the program's status as an adequate training ground, has forced Quick Start leaders to consider reducing enrollment — even as demand for the training persists.

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"We're going to have to slow down our pipeline so that we're not putting out more people with absolutely no possibility of employment," Palmer said.

Unless circumstances change soon, she said the program would likely reduce the number of classes — there are set to be 14 this spring across the three colleges.

Hurdles abound

Beyond short-term economics, Palmer believes there are two reasons semiconductor companies have been slow to hire, she said. First, they're waiting to see how CHIPS Act funding gets doled out. In December, nearly 1 1/2 years after the legislation was signed into law, the first CHIPS Act grant was announced. This waiting period has slowed the plans of companies such as TSMC, which is seeking billions of dollars of US subsidies.

"They don't know how much money they're going to get and when they're going to get it," Palmer said of semiconductor companies, adding: "We are being told by industry that after CHIPS money lands, the comfort of planning for the future will open permanent hires." If Biden loses the presidency this year, Palmer said, the uncertainty over funding may further curtail hiring.

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Second, while many chip factories are being built across the US, workers can't staff a fabrication plant until it's built. Construction delays haven't helped matters. Samsung and TSMC, for instance, have each postponed chip production from 2024 to 2025 — the latter said it was due in part to a shortage of skilled construction workers in the US.

Other factors could also slow construction. In December, Commerce Secretary Gina Raimondo said that environmental-review requirements might force the construction of some chip projects to be halted for "up to years."

Congressional efforts to exempt chip companies from some of these reviews have stalled, Bloomberg reported.

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While the hiring mess has been incredibly frustrating for some Quick Start students, given the long-term outlook for the industry, many students in the class I visited seemed to view Quick Start as a valuable opportunity. In the years ahead, the artificial-intelligence

boom could further boost the demand for chips and create more jobs in the semiconductor industry. But for recent Quick Start graduates, who are eager for employment now, promises of future hiring may offer little peace of mind.

In January, I followed up with Gardner, the fast-food worker who turned to Quick Start, to learn how his job search was going. He said he'd tried looking for roles but that more than two months later, he still hadn't landed a job in the semiconductor industry. Gardner told me that it was difficult to pinpoint which jobs he was qualified for.

"I'll keep looking, but it seems like I would have to get an associate's in electrical engineering or something similar to have much of a chance of getting a job in the industry," he said. "I did take this class thinking it would be more of a straight shot into a job, so I'm a little disappointed in that regard."

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In the meantime, he said he's still working at Taco Bell but that he's optimistic about his career path. He said he's about to begin custodian training at a local high school in the coming weeks. If all goes well, he said, this will turn into his primary gig in the short term.

"During my interview, they said there was mobility within custodian work," he said. "So I have faith I'll be all right if I find I can't transition into semiconductor manufacturing."

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