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Pacific Northwest Magazine Where'd The Whiz Kids Go?

Nick Perry

SEATTLE COULD become the new Detroit.

A once-proud hub of innovation left to languish as brilliant people, new ideas and dazzling products bubble up elsewhere. An urban wasteland that's left wondering — as Detroit was with cars — how it lost its mojo with software and the Internet.

That's the dire message Microsoft's top executives are sending to legislators, educators and anyone else who will listen. And nobody is arguing with this simple truth: The state is doing a terrible job producing computer scientists. Those whiz kids who will make computers smarter, faster and more useful for everyone.

"At a certain level, it's simply a tragedy," says Brad Smith, Microsoft's general counsel. "It's a lost opportunity for the next generation of people growing up in Washington state."

Microsoft's warning may sound strange in a region that has thrived from the technology boom of the past 15 years. But Smith says there's no such thing as stability in his business: You're either innovating or falling behind. The industry can turn faster than a Detroit SUV.

The sometimes-bumpy boom has created more than 300,000 high-tech jobs statewide, and the big money flowing from those jobs employs hundreds of thousands more in traditional industries. The state estimates there will be nearly 30,000 openings for computer specialists in the next decade, and the technology they create is needed in every industry from fishing to aircraft manufacture.

Technology has even defined the region. When Seattle looks in the mirror, it sees Bill Gates looking back: a city that's geeky smart, entrepreneurial, socially compassionate and on the cutting edge of technology.



TOM RESSE / THE SEATTLE TIMES

In a computer lab at the University of Washington, juniors and seniors taking a computer-animation course are gaining practical experience in what has become one of the frontiers in computer science. "I think academics should do what they can to prepare students for the real world," says senior lecturer Barbara Mones.

Yet consider this: Just 160 seniors graduate in computer science or computer engineering each year from the University of Washington, home to the state's most respected program. Another 90 finish graduate degrees.

Computer-science enrollment at the UW has remained flat for seven years, but it's holding up better than at most institutions, where it has dropped sharply since 2000. It got so bad at Seattle Pacific University that this year administrators considered closing their computer science department altogether, a plan that's been shelved for now.

The state ranks 35th in the nation for the percentage of young adults attending college, and even worse — 42nd in the nation — for the percentage studying graduate-level science and engineering, according to federal data. That puts us between Tennessee and Alaska.

By contrast, Seattle has, almost by accident, become the most educated city in the U.S. Engineers and computer specialists make up a higher proportion of the workforce here than just about anywhere else.

That's because fresh graduates are flooding into Microsoft, Amazon.com, Google and other companies with operations here. But they're not from Magnolia or Mukilteo. They're coming from Boston, California, India.

"It is an outrage," says former legislator Denny Heck, who's been appointed by Gov. Christine Gregoire to Washington Learns, a blue-ribbon group charged with finding ways to improve the education system. "It's a missed opportunity for local citizens and the local economy of epic proportions."

Three years ago, Microsoft Chief Executive Steve Ballmer said he was stunned to discover that just 8 percent of the company's workforce was educated in Washington.

Since then, despite Ballmer's fist pounding, that figure has likely worsened. Among the 33,000 Microsofties working in Puget Sound, at least 11,000 are foreign-born.

Of course, industry leaders such as Microsoft — by value, the biggest company in the Northwest — are always going to attract top people from other states and around the world. The notion of "local" workers may even seem quaint in an increasingly global economy.

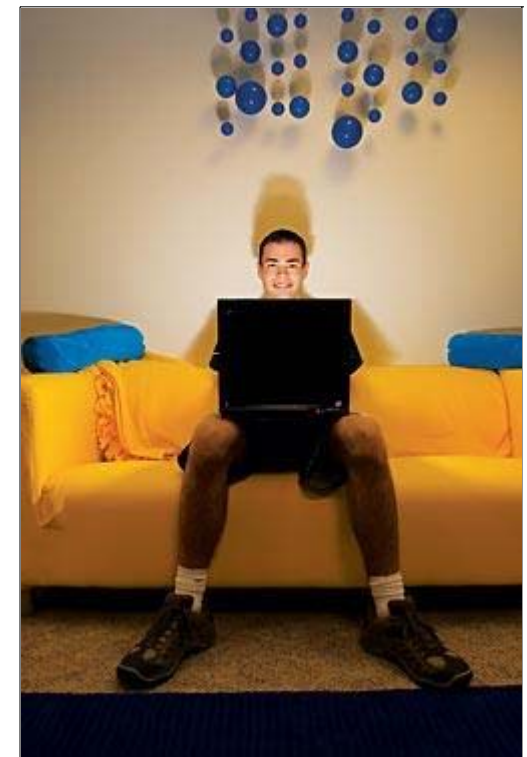
And some question whether there even is a workforce shortage. Marcus Courtney, president of WashTech, the state's largest union for high-tech workers, says Microsoft and other powerful companies are driving the debate in order to create an oversupply of workers and force down wages, as well as justify practices such as hiring foreign workers and outsourcing jobs.

But the fact that the state is not coming close to producing even its fair share of computer scientists has



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Ryan Bachelor of Oak Harbor concentrates during a University of Washington summer program in computer science designed for disabled students. Computers, educators point out, open up a world of possibilities to such students.



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many worried.

With other states and countries — think India and China — leaping ahead in the technology race, Seattle may find it harder to continue luring top talent here, and companies may decide to take their toys elsewhere. Seattle's boom-and-bust history could repeat itself.

The shortcomings of public schools and universities here may already be discouraging some talented people from coming, Smith argues, because smart people want to live somewhere they can send their kids to great schools. There may be an unfounded complacency that Seattle's natural assets will continue to draw people.

"This is an important time in state history. There's been this economic success and dynamism," Smith says. "Do we build on that and make it sustainable, or do we see our moment in the sun slip away?"

EXPERTS IN higher education and the high-tech industry point to all sorts of things to explain why more locals aren't getting involved in computer science:

- The UW doesn't have enough slots for computer-science students, and more than half the applicants are turned away.
 - By its own estimate, the UW gets \$4,000 less per student in state funds and tuition than its peer institutions around the country. The result is the university cannot afford to employ as many top computer professors as it would like — academics who could, in turn, attract more top students.
 - The state boasts just two research universities, separated by a mountain range and 300 miles of highway. That doesn't help foster a collegial community of discovery and innovation, as happens in some other states.
- UW students tend to be the most prized by high-tech employers and can command the top-tier research-and-development positions. Other state universities have respectable programs, as do Seattle University and Bellevue Community College.

- The pipeline of students coming into higher education is thin, and the pipeline of science and math students thinner still. The state's K-12 education system is simply not training students well in math and science. The field is also overwhelmingly male, which discourages some female students.
- Students can find the subject matter difficult, dry and unforgiving. Kids and parents may not be pushing hard enough. There are fears about outsourcing, and some students were discouraged by the dot-com crash, which hit Seattle particularly hard.

Software engineer Trevor Hamilton, 23, was beginning his senior year at the UW when he was recruited by Google. Impressed with all the "cool stuff" going on, he began working at the Kirkland office last year after graduating. Now he's thinking of buying a house on the Eastside.



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Jameson Ernst catches a robot pushed aside by a rival robot at Western Washington University. It's Robot Derby Day at the end of the academic year, one of the fun parts of being in the computer-science program.



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But fears about the industry's health don't match the strong employer demand.

In fact, right now a UW student with a bachelor's degree in computer science can expect to make \$75,000 in his or her first year. Top students are also being routinely lured with \$20,000 signing bonuses — something not seen since the late 1990s.

Call it the Google factor. The California-based company, a favorite among students because of its freewheeling culture and big ambitions, has aggressively expanded with an emphasis on employing the industry's brightest young prospects.

"Google's taken a money-is-no-object approach to hiring," says Glenn Kelman, chief executive of Redfin, a Seattle startup that allows people to buy and sell homes online. "It's really skewed the playing field."

Google's operations here are small but growing. At its engineering center in Kirkland, which employs 150, there are the signature signs of the hip employer: lava lamps, a loaded snack bar, splashy primary colors.

Narayanan Shivakumar, an engineering director who helps run the office, says Google's growth here will be limited only by the talent. Company leaders have told him and others they can keep hiring as many top people as they can find — but when the talent pool runs dry, they should stop. Last month, the company began taking out full-page ads in Seattle newspapers: "Google is looking for engineers with great expectations."

Beyond the base pay, Google recruits are excited about other possibilities, such as landing a "Founders Award" — typically given to teams of five to 10 employees who create great new products for the company. Shivakumar says he and his small team recently won a \$10 million award.

That's right: \$10 million to split among the team. There aren't too many jobs where workers can become millionaires practically overnight.

Kelman says Google and other companies have created an excitement in the industry missing since the heady days of the dot-com boom. He witnessed it firsthand at a recent Redfin party:

"People were working that room up and down, recruiting, passing out business cards. There's that energy or buzz again, everyone's working everything and worried they're not at the hot spot. The venture capital's flowing in . . . and people are once again looking for the big score."

The big score is stock options, and the millions they can bring employees if a startup successfully lists on the stock market. Yet Kelman says he's disappointed the city hasn't produced more great startups,



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considering the industry giants in the backyard. Companies like Redfin, he says, are easily able to recruit skilled workers wanting a new challenge.

"There's this giant sucking of talent into Microsoft and Amazon, and it comes out the other side, as people settle here," says Kelman. "Thank God for Amazon and Microsoft . . . without them, we'd be Cleveland."

IN A THIRD-FLOOR computer lab at the UW, juniors and seniors taking a computer-animation course are studying their creation, an image of a deer, which is projected onto a large screen.

They take turns pointing out flaws: Its coat looks more like feathers than hair. The outline is jagged. The coloring uneven. It has a "wet" look.

The 20 students are producing a short, animated film based on a mythological tale by Florida author Gerald Hausman. Each student is assigned tasks and critiqued by the others as they hustle to polish the film in time for a fall screening.

Working from a storyboard, the students must consider how to depict movement, shadows, background. When to zoom in on a face, when to cut to a new scene. How to keep the story lively? Some of the students thrive on the technical challenges; others focus on the artistic elements.

The capstone course is aimed at giving students some practical experience in what has become one of the frontiers in computer science. The students talk of landing a job at a Hollywood animation studio such as Pixar, or perhaps working in the thriving computer-game industry.

Student Maxine Toh, 22, who grew up in Burien and attended Mount Rainier High School, says that from an early age she played a lot of video games and became interested in discovering more about computers' inner workings. Pursuing that passion made her unusual among her high-school peers, who are now studying business, economics, biology.

"It's like you're always on the edge of the new thing," Toh says. "You're able to help people by making life a bit easier."

Being a woman in a field dominated by men adds another layer of challenge.

"Part of it's a psychological thing," she says. "Guys, even if they don't know what they're doing, pretend to know what they're doing. They exude this confidence."

By the start of her senior year, Toh had been recruited by Boeing, where she's now part of a two-year program for young employees considered to have leadership potential.

Animation is just one hot area in computer science. Another is computer vision — the ability of a computer to recognize and interpret images.



TOM RESSE / THE SEATTLE TIMES

UW computer-science student Maxine Toh, center standing, says students entering the workforce vigorously debate the merits of different companies: Google, Microsoft, Amazon, Expedia. Whether to go with a big, established outfit or try their luck with a startup. "Take Microsoft," she says. "Some people really love it. Other people say 'Oh, Microsoft is evil.'"

The field has huge potential: Imagine a computer that can scan through thousands of X-rays and medical images, then pull out one patient's chart because there are signs of cancer. Imagine an Internet search engine that can recognize a dog or a sunset not by a keyword but through shapes and colors.

That's the sort of stuff recent UW graduate Jenny Yuen has been studying.

"It's always surprised me that computers are so quick with computing numbers and calculations, but in terms of recognition, a baby can recognize their parents a lot better without much training," says Yuen. "That's when I got curious about recognition."

Born in Hawaii and raised in Mexico City, Yuen had planned on studying in Mexico until a university strike there prompted her to consider options in the U.S. She'd heard good things about the UW. Now 23, she'll begin a Ph.D. at the Massachusetts Institute of Technology this fall.

Yuen says that by her third year of high school in Mexico, she was required to choose her classes, a system she thinks helped her focus on her strengths from a young age. By contrast, many of her UW classmates hadn't decided on a major until well into their college career.

For some local students, computers can broaden opportunities. Take Gabe Murfitt, 16, born with malformed limbs. This summer, the Woodinville High School junior attended a computer camp at the UW called DO-IT (Disabilities, Opportunities, Internetworking, Technology.)

"People are equal, no matter what disability they have," Murfitt says. "They can basically do anything on a computer."

Yet despite the seemingly limitless potential of computers, educators are having a tougher time than ever convincing students to pursue the field. It can be hard work. Boring, even. And there's that enduring, if unfair, image problem. Picture the socially inept geek hunched over a screen at 3 a.m., Coke in hand, pecking away at pages of incomprehensible code.

AT WESTERN WASHINGTON University, it's the end of the academic year and it's Robot Derby day. Computer-science students have spent weeks perfecting small Lego robots, which face each other off Sumo-style, aiming to push a rival robot out of a small ring.

The classroom is stuffy and hot, but the students don't seem to notice as they eagerly handicap the battles. Some students have designed battering-ram-style robots to overpower opponents, while others have gone for stealth with bots that lay low and can upend larger machines. One student has come up with the ingenious idea of a robot that emits radio signals to electronically disable rivals.

It's the type of fun that department chairman David Bover hopes will reinvigorate the program at Western. To combat dwindling student numbers, Bover last year began offering freshman classes in computer game development and robotics — programs previously restricted to more advanced students.

"We thought: 'Let's bring some of this interesting stuff right up front,' " Bover says. "If it looks boring, there's no fun in that."

Early results suggest the changes might be halting enrollment declines. Bover says the department has also started working more closely with Microsoft, which is particularly interested in graduates proficient in testing software. To that end, Western will offer a new program focusing on testing this winter. Bover acknowledges it may be hard to sell to idealistic students.

"There is a stigma with the word 'tester,' " he admits. "It's not the cool side. All the students want to start with a clean slate and develop something new. But most will end up working with something that someone else developed, or half-developed. It's very rare a fresh graduate gets to develop a whole new system from scratch."

"We don't get to be Adam and Eve in the Garden of Eden," Bover explains. "We're stuck with what we have."

At the UW, President Mark Emmert is frustrated there aren't more computer-science students:

"There was such a boom of interest in the '90s, and now you get the sense around the country that computer science is past its prime. But the most exciting stuff is still in front of us."

He says the UW can improve.

"We need more faculty and more facilities, and to do more work with high-school students, to get them interested and excited about computer science," Emmert says. "We know the governor is very interested in finding ways to increase high-demand educational opportunities."

Gregoire's panel is coming up with some sweeping suggestions. Ideas include giving every freshman student about \$2,500 toward tuition and pumping extra money into high-demand fields such as computer science. The panel is to release a final report in November, and Gregoire may take some of the suggestions to the Legislature next year.

Meanwhile, Microsoft continues to add workers locally at the rate of 4,000 a year.

In this year's record class of 5,400 UW freshmen, 300 say they're hoping to graduate in computer science or engineering. Even if none dropped out or changed majors, the class of 2010 wouldn't amount to a month's supply of new workers needed just at Microsoft's Redmond campus.

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