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Whiz-kid Daniel McInnis heads to uni
inventions, international accolades



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[More from Adam Feibel, Ottawa Citizen](#)

Published on: June 23, 2015 | Last Updated: June 24, 2015 5:52 PM
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After Daniel McInnis comes home after school, he'll feed the dog, do his homework, eat dinner and, if he's lucky, see some friends. More unusually for a 17-year-old, he might have to attend a school board meeting as a peer-elected student trustee.

But McInnis will always make time to retreat to his "laboratory" — the basement — where he has engineered two potentially groundbreaking products that have won him accolades in the international teen science fair circuit. It might just be another all-nighter.

For many bright young minds, straight As and university admission applications are the central focus of their final years of high school, but McInnis has also developed a hockey helmet that promises to reduce concussions more than any other on the market, and a 3D scanner that can expedite bone transplant surgery and draw up blueprints for custom prosthetics.

"It didn't seem like I was doing anything that big," says McInnis. "But when you go out there, present it, and look back on it, you realize that some of the things you were doing were really impactful."

The soon-to-graduate St. Francis Xavier High School student appears to embody many of the lofty characterizations of Generation Z, a cohort born in the mid-'90s or later heralded as a generation of self-starting innovators who can change the world.

Emerging research has portrayed them as independent, motivated, digitally connected and environmentally conscious. One study of 11,000 young people, published in the 2008 book, *Grown Up Digital* by Don Tapscott, found the majority would rather be smarter than better looking. (They're also described, however, as having shorter attention spans, weaker social skills, a proneness to the "fear of missing out," and less physically active lifestyles than previous generations.)

Other studies suggest 72 per cent of today's high school students want to start their own business some day, more than three-quarters hope for a hobby to turn into a full-time job, and 38 per cent they believe they'll invent something that changes the world.

"In the next five to 10 years, I think a lot of people will be doing very different stuff while they're still in high school or just starting university, which is really exciting to see," McInnis says.

His own experiments began in Grade 8, right after his second — and worst — of three minor-hockey concussions. Once the blurred vision, severe headaches and nausea subsided, he wondered what he could do to reduce brain injuries in contact sports.

He tested various hockey helmets using a crash-test dummy head loaded with accelerometers and motion sensors, then designed a helmet he says offers five times the protection against both linear and rotational impacts. It won him the Best Junior Project award at the 2011 Canada-Wise Science Fair.

In 2014, he landed a \$5,000 grant from Kevin O'Leary through a *Dragon's Den* teen entrepreneurship fund. Now, he's looking for investors to help bring it to market or license the design to a major manufacturer. He's patented the helmet in Canada and is tying up loose ends with the United States patent office.

Meantime, he turned his attention to a 3D scanner he developed that promises to improve the accuracy and efficiency of bone transplants and the quality of and access to prosthetic limbs.

Current computer-assisted bone transplant surgery uses a probe that touches the bone, taking up to 30 minutes to read its shape. McInnis's scanner projects lines on the bone, measures how the lines warp based on the bone's shape, then takes multiple images and stitches them together to create a more accurate 3D imprint in about 45 seconds.

His scanner, built for \$500 using off-the-shelf components, can also create a prosthetic limb using a three-dimensional printer. It can read a person's opposing arm and mirror it to see what the missing arm should look like, then 3D-print a custom-fit prosthetic based on that image, at a cost of \$300 to \$600 compared with thousands of dollars for a conventional prosthetic.

In 2014, he won Best Overall Project in Canada and a Manning Innovation Award at the Canada-Wide Science Fair, and then the PZU Foundation Prize for "helping to improve the global standard of life" at the European Union Contest for Young Scientists in Warsaw, Poland. This May, he travelled with Team Canada to Pittsburgh, Pennsylvania, and placed third in the computational biology and bioinformatics category at the Intel International Science and Engineering Fair.

It's an impressive resumé for a student council co-president and member of the Catholic school board who still needs time for a social life. "Balancing everything can be hectic," he says.

"He's always had big dreams, and he seems to get there," says his mother, Patricia McInnis, a family physician. Her son's success, she says, has inspired her to encourage all the children in her practice to "dream big."

"I always thought that engineering was his thing. He was very comfortable with computers, inventing things — and the basement was never, ever tidy."

McInnis is off to University of Toronto's prestigious engineering program on a hefty \$80,000 scholarship — one of eight scholarships he was offered by universities across Canada — all with an eye to turning his projects into businesses.

"I'm not the type to be told exactly what to do or be given exact boundaries to stay within," says McInnis. "If I got locked up in some sort of job where I didn't really have that creative control, or if I was in a situation where I wasn't able to go out there and explore different things, that would be difficult for me.

"This has shown me that it is possible to break those boundaries."

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John Burke

Canada needs an elitism ethos in education to recognize and to cultivate bright minds that will carry us forward and push the boundaries of knowledge and technology.

Hopefully you are right about gen Z may they be brave entrepreneurial and smart. This lad combines all three.

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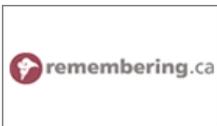
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