



The Doctor is Out

The mountain towns and other places where Calgarians go to recreate have an abundance of natural beauty, wildlife and outdoor activities. But what they and other rural communities often lack are surgical, trauma and emergency medical services. For those who make these and other non-urban areas their home and those who are there to visit, a scenic setting often comes with a price.

Here, in a picture-perfect moment captured on an iPhone, photographic evidence of that ominous adage: life can change in an instant. Lorna White standing in a stream, looking up at her hiking companion, frothy alpine waters gurgling at her feet. “Stay right there,” her friend, Krista, had instructed on that sunny Sunday in 2015. “That’s a great photo.”

White smiled. Krista got the shot. White turned around to resume the hike out of the Purcell Mountains, intending to drive back to Calgary that night.

And that’s when she saw it — a massive boulder “the size of a minivan” tumbling down the mountain toward them. White screamed at Krista, who stood in the boulder’s path. But before the rock reached her, it bounced and landed near White, breaking on impact. A remnant the size of a piano redirected toward White. She remembers turning and ducking before the rock smashed into her, pinning her to the ground, bent at the waist, her head, her legs and right arm trapped underneath the rock.

The first responders who arrived on scene reported that only her shoulders, back and left arm were visible. “I kept saying to myself, ‘stay awake.’ I was scared to fall asleep,” White recalls.

Her friend ran for help, summoning another group of hikers which, by chance, included trained experts in wilderness first aid. Someone phoned down to Canadian Mountain Holidays’ Bugaboos Lodge, which sent a helicopter. Using heavy-duty jacks and pry bars brought by the chopper over repeat trips, rescuers were able to lift the rock just enough to extricate White. She was flown to the lodge, where she was transferred to a STARS (Shock Trauma Air Rescue Service) helicopter and whisked to Calgary’s Foothills Medical Centre, all within a few hours of the accident. Miraculously, White’s injuries were limited to a broken arm, a broken thumb, fractured sternum, three fingers that required amputation and soft tissue damage, plus emotional trauma (for which she saw a therapist).

“Whenever I think about it, I still cannot believe how I possibly survived,” says White.

There’s a term used in emergency medicine, “the golden hour” — the first hour after a traumatic injury during which there is the greatest likelihood that medical care will save a person’s life. Whether someone is injured in the mountains, in a car crash or at home, their chances of survival are best if they can get treatment quickly. For severe cases, treatment often requires surgical intervention.

In a city such as Calgary, getting an injured or sick person to medical and surgical care can be swiftly accomplished. But in many non-urban areas — including those frequented by Calgarians for recreation — and where 70 per cent of Alberta’s fatal car crashes happen, it is more complicated, as rural towns across Canada are losing services such as surgeons and 24-hour medical care and relying instead on medical transport to get sick and seriously injured patients to cities for treatment.

The state of rural health care affects not only the residents of rural communities but, as is the case in recreation destinations, people who live in cities, too. About 12 per cent of patients seen in the emergency department of the Banff Mineral Springs Hospital are from Calgary. In Golden, B.C., 11.9 per cent of patients are from Alberta; at the Queen Victoria Hospital in Revelstoke, 8.5 per cent. And at the Invermere & District Hospital’s emergency department, one in four people treated at the emergency department is from Alberta.

As Laurie Norris, a retired emergency nurse in Sylvan Lake, Alta. put it: “Calgarians don’t realize that if they need medical attention while they’re here, they would need to drive 22 kilometres into Red Deer. Twenty-two km to someone who is injured or has appendicitis is a long drive.” Sylvan Lake does have an ambulance, however it may not be in Sylvan Lake at that particular time. “So you can still get an ambulance, however, it may have to come in from Red Deer or another outlying area,” Norris says.

In the ski town of Fernie, more than 10,000 patients came through the emergency department of its single-story, brown-and-brick Elk Valley Hospital last year. Of these, nearly 12 per cent were visiting from Alberta. Located approximately a half-hour’s drive west of the Alberta border, the picturesque town encircled by the Rockies has a population of 4,850 and approximately 2,700 private dwellings, many of which are second homes owned, most often, by Albertans hooked on the world-class alpine activities in the area.

But while Fernie’s population has grown by 16 per cent since 2011, its breadth of health-care services has diminished. The Elk Valley Hospital’s only general surgeon retired last spring and although the town had advertised for a new surgeon for more than five years up to that point, the position was left vacant. This isn’t a terribly big surprise, as it is difficult to recruit physicians in much of rural Canada — 18 per cent of Canadians live in rural areas but only eight per cent of physicians do, and it’s especially difficult to attract general surgeons to work in small towns. The reasons are many: in a small community, a single general surgeon can be on call 24 hours a day, seven days a week without back-up; surgeons often train in large urban centres where most will sub-specialize in certain types of surgery (hernia, breast, trauma, for example) with less focus on procedures such as Caesarean sections that can be the bread and butter of a surgical practice in a rural town. Additionally, it can be difficult for a surgeon’s spouse to find employment in their field in a small community.

But the shift of physicians from rural areas goes beyond individual surgeons’ preferences for where they’d like to live. Regional health-care systems across Canada tend to funnel surgical and very sick patients to larger centres, both to reduce costs and improve patient outcomes. And there’s evidence that surgeons and hospitals

performing higher volumes of specific surgical procedures produce better results for patients (however, this finding is not without debate).

For the Elk Valley Hospital, with a catchment area of nearly 15,000 people, the loss of the general surgeon has left gaps in care, says Fernie-based gastroenterologist Dr. Tara Chalmers-Nixon. Basic surgeries such as appendectomies, removals of minor lumps and bumps, gall bladder removals, hernia repairs and carpal tunnel and trigger-finger surgeries (not uncommon in Fernie with its high proportion of manual labourers) can no longer be done locally. Most surgical patients are now sent to Cranbrook, B.C.; the more complex cases to Calgary or Kelowna.

When a hospital loses its surgical service the domino effect can be “devastating,” says Chalmers-Nixon. “With loss of regular elective surgeries, we lose the skills of our operating nurses and our anesthetists, then we lose the ability to perform emergency C-sections, then we lose our maternity program, then we stand to lose it all.

“Maybe I’m being dramatic but evidence has shown that the gradual loss of surgical programs adversely affects rural health and access to medical care,” she says.

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—Dr. Douglas L. Myhre, Cumming School of Medicine, University of Calgary

In 2013, Drs. Mike Stuckey and Deena Case, a husband-and-wife duo, arrived in Fernie from Australia. Stuckey and Case are family physicians with additional training in obstetrics and, for Stuckey, anesthesia. Their presence in town means women can still have Caesarean sections in Fernie — albeit only at certain times. The hospital’s operating room closes every second weekend and for five weeks during the summer to accommodate a shortage of nurses. The rest of the time, Drs. Case and Stuckey alternate nights on call — meaning someone in their family is on call every night. When the operating room is closed, all maternity patients in labour, with the exception of very low-risk patients, are transferred to Cranbrook. “That’s not ideal by any means but that’s what happens when there’s inadequate staffing,” says Case.

Twice last winter, the highways going north and south out of Fernie toward hospitals in Calgary and Cranbrook, respectively, were closed simultaneously due to ice and snow. And last August, one labouring mother en route to Cranbrook by car was involved in a motor-vehicle accident. Fernie’s physicians hope the town’s surgical access will be more consistent next year when a family doctor with surgical skills is due to begin work in the summer of 2018. This will lighten the call load on the Case-Stuckey household and allow for some minor surgical procedures to be done in town.

The problems that Fernie faces are not unique, however. Dr. Douglas L. Myhre, a family physician who practiced in Lethbridge for more than two decades before joining the faculty at the

University of Calgary, works with physicians, medical trainees and policymakers across the province to remedy health-care inequities in rural and remote areas. Myhre says that many small towns throughout Alberta and British Columbia experience closures of hospitals and urgent-care clinics as a cost-saving measure or are unable to recruit physicians.

“[Mountain towns such as] Fernie, Revelstoke and Kimberley have an issue; but, it’s no worse or better than places like Pincher Creek, Taber or Crowsnest Pass,” he says. “No surgeon means no obstetrics and that means less use of the hospital and then it gets downgraded. Fewer services, means less teaching, means less ability to recruit. You have a spiraling and dwindling of resources that becomes almost inevitable. It’s a cascading event, which is all defended by talking about economics and cost and centralization.”

Myhre emphasizes that the quality of health care in rural areas remains high, however, the availability of services is concerning. In 2016, the College of Family Physicians of Canada, in collaboration with the Society of Rural Physicians of Canada, released a background paper on the challenges for medicine in rural communities. It stated that Canadians who live in rural communities tend to have poorer health than their urban counterparts — a disparity “directly related to their distance from urban cities.” This trend, they found, is particularly severe among Indigenous populations, which often live in rural and remote communities.

The increasing shift of health services to urban centres means small communities are experiencing the loss of more than surgeons. Sylvan Lake draws more than 750,000 visitors a year to its kid-friendly waters but currently lacks medical services at night and on Sundays.

Residents and physicians have been lobbying for an urgent-care facility since the winter of 2012, when more than 500 people attended a town hall meeting on the issue.

In the summer of 2013, on a Saturday afternoon, Brent Boychuk, a 49-year-old Sylvan Lake resident, became ill from carbon monoxide exposure while working on his house. In a video created by the Sylvan Lake Urgent Care committee, Boychuk’s widow tearfully recounts how their daughter drove him to two different clinics, finding both closed. Boychuk collapsed in front of the second clinic. His daughter performed CPR until paramedics arrived but he died before he could get to hospital in Red Deer.

An advanced ambulatory care service is anticipated to open in Sylvan Lake in May 2018.

Key to Canada’s rural-and-urban health-care structure is the transport system that connects the two. In places without 24-hour medical care or a surgical service, transport is critical to getting patients timely and reliable access to health care. This is true not just in instances where the clock is ticking during the “golden hour” of trauma. Residents of smaller communities, when questioned for a provincial government study of rural health care, said they were frustrated by frequent and long-distance travel for treatments such as dialysis and chemotherapy.

“Sadly, the committee heard about cases where patients had chosen to discontinue treatments because of the hardships introduced — a choice that had, in some cases, resulted in premature death,”

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11 CALGARY LOCATIONS & ONE IN BANFF

states the Rural Health Services Review Final Report, which was published in 2015.

Rural transport is more intricate than one might think, consisting of land and air ambulances, as well as private vehicles, working across provincial borders and paid by different provinces, and constrained by factors such as weather, regulations and staff shortages. Newborn babies from Fernie are unable to be transported to Alberta due to provincial rules. As a result, the nearest places these babies can go are Kelowna, 625 km away, or Vancouver, 939

km away. When a premature infant requires transport, a member of the care team travels from one of those cities to Cranbrook by plane. There, they switch to a road ambulance to drive the 96 km to Fernie to pick up the child, returning by the same long route. “As you can imagine, the babies don’t always have the best possible outcome,” says Case.

From its bases in Calgary, Edmonton and Grande Prairie, STARS flew 1,529 missions in the 2016-2017 fiscal year. About three-quarters were transfers from rural hospitals to metropolitan centres; the remainder were calls to scenes such as car wrecks or farm-related accidents. STARS’ efforts are often about getting someone to a place with surgical services, says operations manager and paramedic Bob Odney. “If you need a surgeon, you need to get back to the city quickly, so that’s what we do,” he says. “Studies have shown that the quicker you can get somebody back to a surgeon, the better outcomes they have. If you’re bouncing around on a country road for two-plus hours in the back of an ambulance, it doesn’t give you as good a chance of survival if you need a surgeon as if we fly you in 30 minutes back to a surgeon. That’s where we make the biggest difference.”

Head west from Calgary along the Trans-Canada highway to the mountain towns of Canmore and

Banff and you’ll find a relative abundance of healthcare services for places of their size. The region, which draws more than 4 million tourists a year, breaks with the pattern of rural medicine throughout much of the province. Both towns have hospitals with acute care and surgical services (though surgical services are not available 24 hours and urgent surgical patients are sent to Calgary overnight and on weekends). Canmore doubled its maternity delivery rooms this year from two to four.

In fact, some Calgarians choose to be treated in these towns where wait lists for some treatments are known to be shorter, especially in the cases of minor emergency care and some non-urgent surgical procedures. Banff, with its three orthopaedic surgeons and a plastic surgeon, has developed a reputation for excellence in all sports-related orthopaedic surgery — especially knee surgery. A search on Instagram pulls up photos of Calgarians grinning as they lean on crutches outside the Banff Mineral Springs Hospital.

“I feel we are lucky in Canmore to have resources like a CT scanner, surgical specialists, ALS [advanced life support] paramedics and many family MDs, which many mountain towns like Fernie, Revelstoke and Golden do not,” says Dr. Kyle McLaughlin, an emergency physician in Canmore. Banff and Canmore also don’t have difficulty recruiting physicians. Quite the opposite: physicians who want to work in these communities full-time may have to wait for a position to open. McLaughlin worked part-time in Banff for six years and in Canmore for approximately two years before a full-time job in Canmore became available.

But it just goes to show that the health-care services in every town are a reflection of that town’s unique characteristics: its proximity to a city, its economy, its ability to attract tourists and physicians alike and other factors. What works for Canmore and Banff won’t work for Fernie, Sylvan Lake or other communities throughout Alberta and British Columbia, as there is no one-size-fits-all solution for medical care in rural areas.

Nearly four years ago, several national physicians’ groups — representing family doctors, obstetricians and gynecologists, general surgeons and rural physicians — met in Banff to discuss the challenges of rural surgical care. They agreed the answer lies in some kind of a networked system of care, linking urban specialists with rural generalists. But the ideal formula remains unclear.

Different approaches are currently being used across Canada. In Ontario, general surgeons provide most surgical care in remote areas, while towns across western Canada rely on about 150 family physicians who have undergone some surgical skills training. Some of these family physicians are international medical graduates who trained as surgeons abroad but work as family doctors in Canada. There is currently only one program in Canada, located in Prince Albert, Sask., that teaches surgical skills to family doctors. Fifteen family physicians have graduated from the program since its inception in 2007 — a number that falls far short in matching the number of retiring rural general surgeons.

Dr. Stephen Hiscock, a general surgeon in Salmon Arm, B.C., points out that Canada has an excess of general surgeons but they are poorly distributed across the country, disproportionately based in cities that have surgeons who are currently underemployed or unemployed. Jurisdictions across Canada are exploring different options to address this imbalance, looking at ideas such as rotating general surgeons into smaller communities for short periods, attracting more rural students to medical schools and developing surgical residency programs that prepare surgeons for rural practice. “Our job is to look after people in this country,” Hiscock says. “When you look at people in some isolated areas [their access to health care services] approach that of a developing nation. We can do a better job.”



“IF YOU’RE BOUNCING AROUND ON A COUNTRY ROAD FOR TWO-PLUS HOURS IN THE BACK OF AN AMBULANCE, IT DOESN’T GIVE YOU AS GOOD A CHANCE OF SURVIVAL AS IF WE FLY YOU IN 30 MINUTES BACK TO A SURGEON. THAT’S WHERE WE MAKE THE BIGGEST DIFFERENCE.”

—Bob Odney,
STARS Operations Manager

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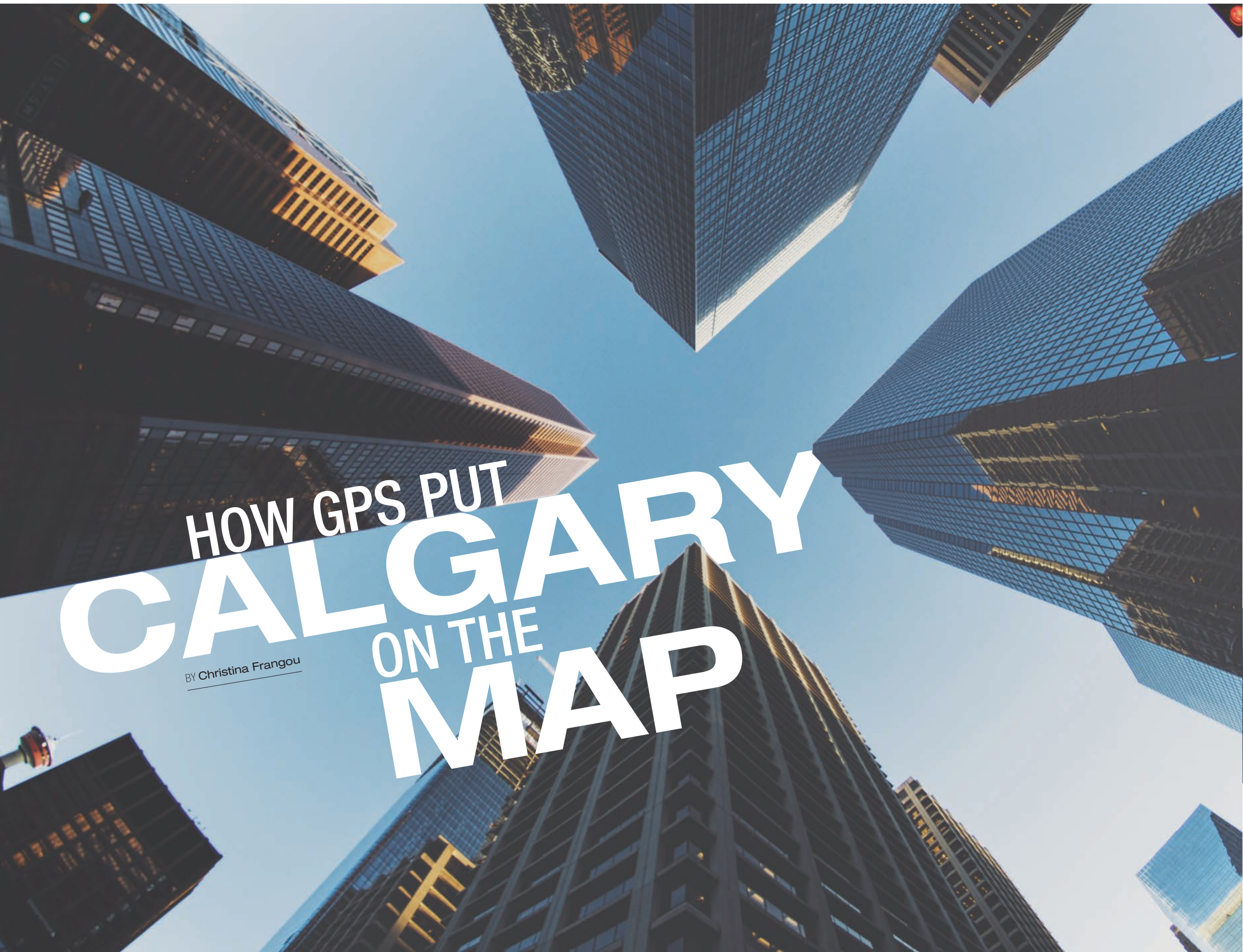
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THE CALGARY
DROP-IN
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HOW GPS PUT CALGARY ON THE MAP

BY Christina Frangou

The idea that tech start-ups are the key to a more diverse economy isn't new. Here's a look back at one aspect of the history of our high-tech future.

Back in 1981, in the dust of the big bust that swept through downtown, leaving an empty 25 million square feet of shiny new office space in its wake, a group of Calgary engineers embarked on a project so out of this world that it would eventually put the city on a new high-tech map.

But the story starts a few months before the bust. In August 1980, Gerard Lachapelle, an engineer with a dimpled chin and a bright Quebecois accent that hadn't dimmed during four years of postgraduate study in Europe, arrived in Calgary to join Shell Canada. He worked with a small team doing a type of surveying work that used then-modern techniques involving a network of satellites known as the Global Positioning System (GPS). GPS was very much in its infancy — only a handful of satellites were in geostationary orbit, nowhere near the constellation of 27 satellites that exists today and provides a precise, continuous system.

"I remember our first piece of equipment that we were working with to learn the system. It weighed 500 kilos," says Lachapelle. "Thirty-five years later, 500 kilos has shrunk into a chip inside this," he says, picking up his iPhone, "which is more powerful than the initial receiver. That chip is about the size of half a thumbnail and that chip can do all the GPS stuff. This is how much it has progressed."

That progress was unimaginable to the handful of engineers working on GPS in downtown Calgary in 1980. But even then, they knew that the expensive, clunky technology could one day play a role in high-precision areas of oil and gas development where every centimetre counts. That's what Lachapelle and his colleagues were striving for in October 1980 when the National Energy Program was announced (a federal revenue-sharing initiative enacted by the Trudeau Liberals that many Albertans decried for siphoning hard-earned profits out of the province). They were still working on GPS when the industry took a subsequent blow in 1981 as the global price of oil plummeted.



A TI4100 GPS receiver developed and built by Texas Instruments in the early 1980s, the first field-deployable GPS receiver on the market. Calgary-based Nortech Surveys ordered the first four commercial units produced in 1981 and used them to successfully conduct surveys around the world for the ocean-exploration and energy industries until the late 1980s.

Over the following year, as unemployment in the province surged and newspaper classified ads began listing homes still filled with furniture for sale at bargain prices, Shell dropped its plan for in-house GPS development. Lachapelle and about 10 colleagues borrowed money to buy the assets from Shell and formed their own company, Nortech Surveys. Their goal was to provide navigational and positioning services using GPS to the oil-and-gas industry. Soon after, they created Norstar Instruments Division to develop GPS software.

Elizabeth Cannon, then an undergraduate student in engineering at the University of Calgary, joined Nortech as a summer student in 1983 — the only female engineer among the company's 50 or so employees. Nobody outside the company, she says, understood what she meant when she said she worked in GPS. (The technology did make headlines that fall when, after Korean Air Lines Flight 007 was shot down for wandering into Soviet airspace,

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—Dr. Elizabeth Cannon, president and vice-chancellor of the University of Calgary

U.S. President Ronald Reagan announced plans to open up for civilian use the GPS system that the Department of Defense was working on.)

That summer, Cannon, who has been president of the University of Calgary since 2010, recalls Nortech’s offices were filled with desks without computers. The bulk of their work was carried out in a large computer lab with multiple terminals where engineers worked collaboratively on computer programming and data processing to develop a GPS receiver.

“At that time, seeing how heavy the equipment was, and how expensive it was, you couldn’t have imagined that one day it’d be small enough to fit into your watch and it would be ubiquitous across society,” says Cannon. “It was kind of exciting to feel that you were part of something that was going to be revolutionary. You knew it was going to be important and you wanted to be part of it.” Following her summer at Nortech, Cannon returned to the University of Calgary to pursue graduate studies eventually receiving a Ph.D. in geomatics engineering, the discipline of gathering, storing, processing and delivering information related to location.

In 1986, when the space shuttle Challenger exploded, killing everyone on board, it slowed the development of the modern GPS satellite fleet. The GPS satellites had been designed to be launched by space shuttle as they did not fit onto conventional rockets for launch from the ground. For the following three years, no satellites

LEFT The Norstar1000 unit developed by the Norstar Division of Nortech Surveys between 1985 and 1988 in partnership with two American companies was one of the most advanced commercial receivers on the market. The technology was transferred to NovAtel in 1989.

were launched until the U.S. government acquired Delta II, a rocket designed by McDonnell Douglas, to get satellites into orbit.

The delays in the GPS satellite launch forced Nortech to sell its Norstar division to NovAtel in 1988. NovAtel, a public-private joint-venture telecom company formed during Peter Lougheed’s tenure as premier of Alberta, had been founded as part of the Alberta government’s plan to diversify the province’s economy. The hope was that it would help insulate the economy against future drops in oil prices.

NovAtel came to be known as the high-flying star of the 1980s that then flopped dismally — “a stunning failure,” according to the *Globe and Mail* — costing taxpayers more than \$600 million. But after NovAtel divested its non-GPS communication businesses in the 1990s, the remnant was a profitable company focused on GPS chipsets, the guts of the system. NovAtel, now a private company that still employs 350 people from its headquarters in the city’s northeast, has gone on to become one of the world’s prime manufacturers of high-precision global navigation satellite system (GNSS) components and systems. (Since the U.S. developed GPS, other regions in the world followed suit, building satellite navigation systems of their own. A global system, GNSS, has been built up comprised of all satellite navigation systems in the world, including GPS, the Russian GLONASS, the European Union’s Galileo and China’s Beidou.)

What started as a far-fetched idea by a group of former Shell engineers in the 1980s has since become a launch pad for a spate of start-ups in geomatics in the city, giving Calgary and the surrounding area one of highest concentration of companies in this industry in the country. As NovAtel’s GPS experience grew, so did the University of Calgary’s geomatics department, where both Cannon and Lachapelle (who eventually married after meeting at Nortech) have worked since the late 1980s.

In the 38 years since the department was established, more than 250 masters and Ph.D. students have completed their studies in positioning and navigation work, with an estimated half staying to work in Alberta. Professors have been poached by powerhouse tech companies such as Apple. Numerous patents have come out of research in the department — Lachapelle and his research team alone have around 10 to their credit. One spin-off company from the U of C’s geomatics department, Trusted Positioning Inc., created a new technology for cellphones that allows navigation indoors — “a holy grail of GPS,” one industry watcher said. The company was acquired by Invensense in 2014 for US \$36 million.

“You have this very nice synergy in the city, where Calgary became a bit of a mecca of GPS development, talent development, research and application development,” says Cannon. “When people talk about where are things happening in the world in GPS, Calgary would be one of those few communities that people would point to.”

Calgary’s start-up tech community got a further boost from another unlikely source — the collapse of Canadian tech darling



FAR LEFT An attendee of last June’s Tecnovate tradeshow attempting to ride a bike with handlebars that turn the wheel in the opposite direction than is expected.

LEFT Foot pod, developed by Cochrane-based Dynastream Innovations (now owned by Garmin), lets runners know how far and fast they’re running in real time.

and telecom titan Nortel Networks in the early 2000s. The telecommunications and data-networking equipment manufacturer, which once operated six Calgary-area facilities and was valued at nearly \$300 billion, laid off tens of thousands of people worldwide, eventually letting go of every one of the more than 3,000 Calgarians employed by the company.

Peter Garrett, president of Innovate Calgary, the University of Calgary’s business incubator and accelerator, worked at Nortel from 1980 until 2001. “Most fundamentally, what Nortel and NovAtel did was build a critical mass of people with talent in the digital and wireless sectors — hardware and software developers, project managers, people with the expertise to operate businesses in this space. When NovAtel, and subsequently Nortel, disappeared, those people blew to the wind and, I don’t think it’s too much of an exaggeration [to say], ended up virtually everywhere in the tech sector in Calgary.”

Last June, more than 60 companies from across Canada met at the Calgary Telus Convention Centre for Tecnovate, a tradeshow featuring the latest in geospatial technology (that is, technology of, or relating to, the relative position of things on the earth’s surface). Tecnovate is hosted by Tecterra, a Calgary group that specializes in supporting small- and mid-sized Canadian businesses in the geospatial industry. Tecterra has worked with more than 160 geospatial companies in Alberta, including 69 start-ups.

Among the conference highlights was a station at which attendees could attempt to ride a “backward” bike, where the front wheel turns counter to the direction you turn the handlebars — a deliberately frustrating exercise designed to reinforce the idea that innovation can be uncomfortable and difficult. Tradeshow exhibitors included companies specializing in subjects such as location intelligence, worker safety, energy efficiency, mapping and virtual reality. A few of the local start-ups on site included Decisive Farming (technology that provides farmers with financial and agronomic data, including seed and fertilization recommendations based on their land), LocalIntel (an online site that provides community-by-community demographic and economic information to guide companies looking to invest), and Blackline Safety (technology that provides wireless monitoring of lone workers to track their safety in the field).

Tecterra CEO Jonathan Neufeld says Calgary is developing a reputation as a centre for geospatial innovation on both national and global levels. The province is home to 40 per cent of the coun-

try’s geospatial firms, largely a result of the U of C and the resource companies that have been willing adopters of the new technology.

Neufeld graduated from the University of Calgary’s geomatics program in 2003, well after NovAtel and Nortel’s prime. Looking back, he acknowledges that those companies were instrumental in sparking an industry here. “They were the big giants that paved the way for everybody else, the ones who established an industry presence here in Calgary,” he says.

If you want evidence of a start-up success with roots in NovAtel and Nortel, drive northwest on Crowchild Trail, past the university and the outer suburbs and the Bearspaw Country Club and down the 3.5-kilometre hill with its seven-per cent grade (infamous among road cyclists) into the town of Cochrane. With a population of just over 26,000 in the 2017 municipal census, there is a strong chance that more sport technology is built per capita here than anywhere else on the planet. The town is home to Garmin Cochrane and 4iiii — both makers of wearable sport-technology. And both companies also have ties to the husband-and-wife engineering team of Kip Fyfe and Victoria Brilz.

Fyfe and Brilz moved to Calgary in 1987; he took a job with NovAtel, she with IBM. Fyfe’s position involved writing software for cellphones and, while at NovAtel, he created an unusual patent related to having multiple protocols for a single cellphone. While this was a rarity at the time, it has since become commonplace, modern cellphones having 10 to 20 protocols. One company decided to fight his patent. It failed. “So, I became an expert witness and it’s there I learned the power of a patent,” Fyfe says.

In the late 1990s, two things happened that were gamechangers for Fyfe and Brilz. First, Kip’s brother Ken Fyfe, a mechanical-engineering professor at the University of Alberta, came up with a groundbreaking technology that allowed runners to know how fast and far they were running in real time with a little pod that could be put into their shoes. Around the same time, the couple was in a serious car accident that involved hitting a gravel truck. The experience gave them a new outlook on life and inspired them to embark on their own tech start-up journey. As Kip Fyfe says: “We figured the rest of our life is for free.”

Tecnovate photo by Kendal + Kevin Photography

Waterproof powermeters created by Cochrane-based technology company 4iiii are used by the Oracle Team USA sailing crew.



Working from the couple's new home in Cochrane, it took two tries, but Fyfe and Brilz, along with Ken Fyfe and a fourth co-founder, Jim Rooney, eventually succeeded in launching Dynastream Innovations Inc., developing a foot pod and a wireless technology (ANT protocol) that's used in most wireless cycling and running technologies for athletes. Since the company formed just as Nortel went into its tailspin and NovAtel laid off employees, Dynastream was able to pick up people with technical know-how. Soon after Dynastream finalized its first contract with Nike, the technology exploded into mass consciousness. In 2006, Garmin acquired Dynastream for approximately \$46 million (in cash) and still runs the company out of Cochrane.

Since then, Kip Fyfe and Victoria Brilz have started another company, 4iiii Innovations, just 1.3-km down the road from Garmin Cochrane, producing wireless technologies that give athletes real-time feedback on performance. Among the users of 4iiii products are a past holder of the America's Cup and Tour de France cyclists.

The environment now for technology start-ups in Calgary is very different than it was three decades ago, says Fyfe, who serves on a number of boards for start-up companies and the organizations that support them. "The information they have versus the information I had access to are a hundred-fold different. There are a lot more people doing start-ups. We were the only clowns at the time who were trying to do that."

Garrett, of Innovate Calgary, says that for all the successes, there is still a long way to go for Calgary's innovation community. The field will always be subject to the cycles of commodity-pricing waves: when oil and gas is at the top of the wave, more people will



ABOVE The Bora Hansgrohe and Quick Step Floors procycling team, which includes world-champion rider Peter Sagan, also uses powermeters by 4iiii.



be lured into the energy sector. When it's down, people migrate to tech. "Tech is very complementary to the oil and gas industry in that regard and helps to stabilize the overall economy," says Garrett.

That cyclical nature has advantages and disadvantages for Calgary's geomatics industry. After all, the industry got its start when Lachapelle and his team of young colleagues were let loose from Shell during a downturn and formed their own company. They then grew it during an upturn in the local economy. In the 40 years since, Calgary's geomatics industry hasn't always been on a steady incline. Companies have come and gone; more are likely to come and go. But in the meantime, the city has slowly built up a critical mass of talent. Today, it's more than a few scattershot companies working in isolation. Instead, it's a real ecosystem of start-ups that have put Calgary on the geomatics map. 📍

Sailing photo courtesy of Oracle Team USA; biking photo courtesy of Bora Hansgrohe; product photos courtesy of 4iiii



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Janice McCaffrey

This retired Olympic race walker and elite-level marathon runner hasn't lost her competitive drive, travelling around the world to compete in the Masters Games and coaching aspiring runners in her hometown.

This month, in Auckland, New Zealand, Calgary Janice McCaffrey will take her mark for the 10-kilometre road-running race at the World Masters Games. As a former Olympic race walker, McCaffrey has been in this position more times than she can count — with much higher stakes.

But the old butterflies still show up whenever she gets to the start line, turning her stomach inside out. “I say to myself, ‘why did you sign up for this? You retired a long time ago. You don’t have to do this. Nobody cares what you are doing!’”

Her answer is the same now as it was back then: “But I want it so bad!”

McCaffrey, now 57, represented Canada as a race walker at the Olympic Games in 1992, 1996 and 2000 and also competed in race walking at three Commonwealth Games during the ’90s. In addition to race walking, McCaffrey competed as an elite-level long-distance runner, winning her first provincial title as a Grade 10 student in Edmonton and going on to represent Canada on the world stage. The year following the 2000 Olympics, she ran the marathon at the 2001 Francophone Games. Following that event, a tough race in hot conditions, McCaffrey, then 41, decided she had fulfilled her desire to represent her country as an athlete and effectively retired.

“THE DEFINITION OF FUN FOR A COMPETITIVE RUNNER IS COMPETING, TAPPING INTO AN INTENSITY THAT YOU LIKE TO EXPERIENCE.”

That’s not to say she was done with competing altogether. McCaffrey continues to race as a recreational athlete, and has set age-group records for running in Alberta and Canada. “The definition of fun for a competitive runner is competing,” McCaffrey says, “tapping into an intensity that you like to experience.”

This spring’s World Masters Games will be McCaffrey’s fourth as a runner. At the last Masters Games in Torino, Italy, she won bronze medals in the five-km track event and 10-km road race. She also won gold in the sprint triathlon in 2005 (she started doing triathlons at age 40 after a flare-up of plantar fasciitis prompted her to shift her training to swimming and cycling), and in the 3,000-metre and 10-km race-walking events in 2010.

The Masters are a very different experience than the Olympics. Athletes supply their own gear, there are no formal team uniforms, everyone is self-funded and the only criterion to qualify is age — for many events, the minimum age begins at 30.

McCaffrey had to laugh when she arrived at her first Masters Games. She expected to compete against a bunch of former Olympians, fresh into retirement. Instead, she found herself among a diverse mix of athletes — runners in their 80s, people new to racing and athletes competing in extra events just because they’d already paid to go the Games. “They’re like, ‘I’m here, I might as well get my money’s worth,’” McCaffrey says. In Torino, McCaffrey followed suit and ended up with a respectable fourth-place finish in golf, much to her surprise.

Unlike the Olympics, there’s no real pressure at the Masters Games. “Nobody really cares how you do,” McCaffrey says. “No one’s going to say ‘she let our country down.’”

McCaffrey also regularly signs up for local races, sometimes on a whim, and relishes the ones where she executes her plan perfectly — like last October’s Ambulance Chasers Charity Run where she beat everyone in the five-km category. Her closest competitor, a man in his 30s, crossed the finish line a minute and half after she did. “I [ran] just like I was trying to win a spot to qualify in the Olympics,” McCaffrey says.

When she’s not coming up with her own race strategies, McCaffrey coaches a strong group of long-distance runners known as the Adrenaline Rush Athletics. The team started with a few runners who used to train with McCaffrey in her competitive race-walking days — as they trekked along, they’d ask her for race tips. Eventually, she turned it into a formal coaching business. Though she has never advertised, there is usually a waitlist to work with her. The 30 or so runners on the team are generally between 30 and 60 years of age and have an eye on running the Boston Marathon or setting personal bests.

“I get it. Boston is their Olympics,” says McCaffrey, who was given a “Golden Shoe” award from *Canadian Running Magazine* in 2012 for her coaching.

McCaffrey herself trains six days a week, incorporating two interval sessions with the Adrenaline Rush group. She does at least three weekly 10-km runs and a longer run of a length dependent on whatever distance race she has in her sights. She has hired a personal strength coach to address her slowing pace — it’s something that’s to be expected of a former elite-level runner but it pains her just the same. “I’m on the decline and I’m fighting it hard,” she says.

McCaffrey often finds herself wondering why she fights so hard, why she continues to push herself. Ultimately, her reasons go beyond results.

“The watch doesn’t tell the whole story,” she says. “It’s the experience of being athletic, of feeling athletic — that’s the story.”

Runner Janice McCaffrey will compete this month at the World Masters Games in New Zealand (pictured).



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BY Christina Frangou
PHOTOGRAPHY BY Bryce Meyer

Football player Andrew Buckley at his family farm near Springbank.

Andrew Buckley

From his record-book years as quarterback for the U of C Dinos to an exceptional rookie season with the Calgary Stampeders, this homegrown athlete balances football prowess with medical-school ambitions.

As a skinny high-school student with a shock of red hair, standing all of five-feet-two-inches, Andrew Buckley dreamt of three things: a growth spurt, an acceptance letter from the University of Calgary and a spot on the U of C Dinos' football team.

Eight years later, Buckley stands a broad-shouldered six-feet-plus, is a U of C grad and the most accomplished quarterback in Dino history. And because real life sometimes surpasses dreams, Buckley can add playing for his hometown Canadian Football League Calgary Stampeders to that list, as well.

Last year in Buckley's rookie season with the Stampeders, where he was the youngest

player on the roster, the team's successful regular- and post-season run landed them in November's Grey Cup game against the Ottawa Redblacks. Buckley scored a running touchdown in the fourth quarter — the first Canadian quarterback to score a Grey Cup touchdown since Russ Jackson in 1968. Though the favoured Stamps fell to the underdog Redblacks, all in all, it has been, in Buckley's words, "a dream couple of years."

"If I look back to the start of the season, before I even made the team, if someone had said, 'you'll be playing in the Grey Cup in your first season,' I would have shook my head and said 'you're crazy.'"

WORKOUT

His abbreviated athletic resume reads as follows: twice named the top university football player in the country; two-time winner of the Russ Jackson Award for the university football player in Canada who best exemplifies academic achievement, football skill and citizenship; and the City of Calgary’s male athlete of the year for 2014. As the Dinos’ starting quarterback, Buckley broke national and regional records for passing yards and yards per game. In his first CFL season he played in every Stamps game and scored eight rushing touchdowns in the regular season, tying a CFL record for the most rushing touchdowns by a Canadian quarterback.

Along with his athletic achievements, Buckley, who grew up on a farm near Springbank, has also sustained a high level of academic achievement — enough to garner an interview for the U of C’s Cumming School of Medicine. He has put medical school on hold to play professional football as long as he can, but continues to volunteer and do research at the university. “I’ve learned to dichotomize my life, in a way, to be able to separate [sport and academics],” he says. “It’s really a matter of focusing your energy and attention.”

Now 23, with a penchant for wearing band T-shirts, Buckley looks like your average grad student, albeit a very fit one. In his words, he’s “an ordinary, normal, nerdy type of guy,” but his work ethic is extraordinary. During his years with the Dinos, Buckley worked out at least seven or eight times a week, arriving at the gym most mornings at 6 a.m. and leaving two and a half hours later — a regimen that added 25 pounds of muscle to his frame (“hopefully it was all muscle,” he says).

In addition to team workouts, he also put in many hours on his own, working on sprints and flexibility, running with his dog, and practicing muay Thai and jiu-jitsu.

Even so, Buckley faced a sharp learning curve in his first year of professional football. He had to retrain his body to withstand the rigour of a CFL season, which extends far longer than the university season. His team workouts with the Stamps were all about staying in “game shape,” he says, focusing on light dumb bells, single-leg balancing exercises and preventative bungee work on his hips and rotator cuffs. “You can’t be breaking down your body every week in a tough workout when you have 18 more weeks to go,” he says. “It was a matter of slowing down the workouts



and being able to maintain. It was a new challenge for me.”

During the off-season, Buckley amped up his training, with eight or nine workouts per week, three to four cardio days and maximum strength training. He also worked on his speed and power by running sprints and hurdles at the U of C’s Olympic Oval under the direction of coach Taylor Altilio.

Buckley credits his parents, both physicians, with motivating him to set high standards and passing on an inability to sit still. (His father Rick played for the Dinos in the 1970s.) To this day, family vacations at their cabin in Montana adhere to a five-sports-per-day rule. “My parents always pushed me to not be lazy,” Buckley says. “It’s one thing to do the bare minimum and just get by, but that’s not going to take me where I want to get to.”

Buckley admits he’s driven to some degree by anxiety. During school he worried over every

“A LOT OF TIMES, I THOUGHT MEDICAL SCHOOL MIGHT HAVE BEEN EASIER. BUT YOU JUST HAVE TO TRUST THE PLAN AND TRUST YOUR DECISION-MAKING AND GO WITH IT FULL SPEED,”

exam and was rigid about sticking to his pre-game rituals — pacing out a square pattern on the field as he listened to the same seven songs.

It’s a different kind of pressure playing pro football in front of a hometown crowd with his parents, grandparents, sister, aunts and uncles in the stands. “A lot of times, I thought medical school might

have been easier. But you just have to trust the plan and trust your decision-making and go with it full speed,” he says.

While there’s no knowing how long Buckley will be part of the Stamps’ roster, he is a lifetime member of an exclusive club of athletes who can claim the experience of playing for the hometown team on home turf.

“I really feel embraced by the city of Calgary, just being a Calgary kid and a Canadian quarterback,” he says. “It’s very, very special.”

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