



**RIVER SCIENCE
TRAVELS FULL CIRCLE
& RETURNS TO CAÑON
CITY WITH THE HELP
OF FEDC TECHSTART**



FEDC TECHSTART



COMPANY HIGHLIGHTS

Launched

March 2016

Solutionsz

Data & information to achieve greater conservation Impacts

TechSTART Member

Since October 2018

URL

riverscience.com

Not-for-Profit Organization



PHOTO TAYLOR EDRINGTON

CORE CAPABILITIES

Drone Applications: Unmanned aircraft systems (UAS)—drones—can offer faster, cheaper, and better (resolution and accuracy) data than traditional methods. River Science UAS technology provides new imagery of current conditions in high resolution and elevation models with sub-inch resolution and accuracy.

Real-time Sensors: River Science builds custom Internet-of-Things (IoT) instruments to collect data that is sent to the cloud using cloud-based GIS applications to create meaningful analysis. These IoT devices are built on open-source hardware and software that reduces sensor cost up to 10-fold.

GIS Tools and Story Maps: River Science has apps for field data collection and uses GIS tools to capture data in real time that is placed into interactive story maps. As part of this process, River Science organizes databases, creates data visualizations, and builds interactive story maps.

River Science would not be in Cañon City, Colorado if it wasn't for TechSTART.

**LUKE JAVERNICK, PH.D.
PRESIDENT & FOUNDER
RIVER SCIENCE**

ABOUT LUKE

Luke Javernick wanted to be a pilot when growing up. He and his wife moved from Colorado to North Dakota where he was going to study aviation and aeronautics. But the lack of financial resources pointed him in a different direction to attend Colorado State University (CSU) and study civil engineering.



Javernick and his wife returned to Colorado and haven't regretted the decision since. Javernick found an immediate affinity with the civil engineering discipline and gravitated toward hydraulics—specifically how water moves. As a sophomore,

he ran for office to become the

next President for the American Society of Civil Engineers—and won.

SENIOR PROJECT LAYS GROUNDWORK

For his senior capstone project, Javernick was paired with three other seniors. They elected to tackle a complex problem for the competition—a spillway from a dam with complicated geometry that made it impossible to measure the amount of water flowing out of the dam. However, they built an innovative scaled model that turned the “impossible” into something that was possible. They won the competition, which helped Javernick secure a substantial scholarship if he chose to do a master of science in civil engineering at CSU.

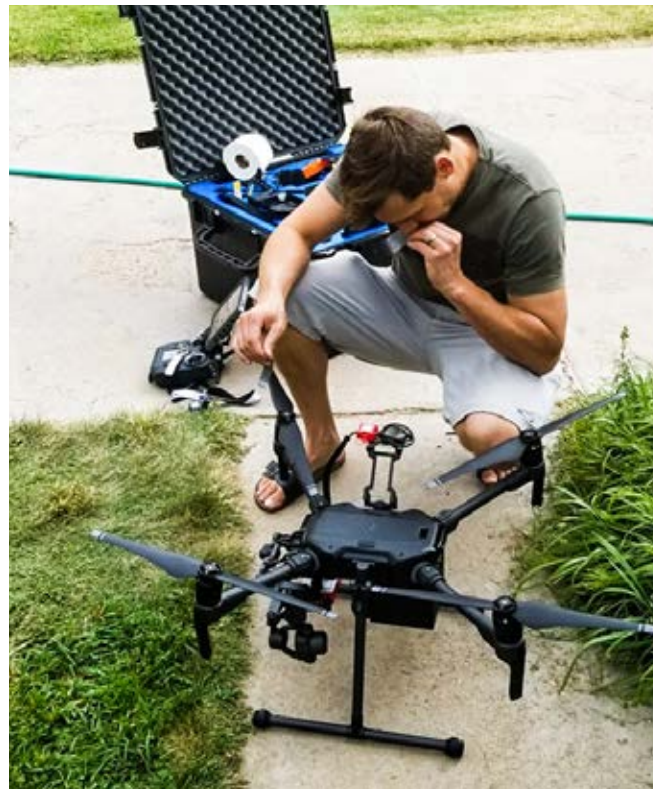
When Javernick noticed a flyer advertising graduate studies in New Zealand, his curiosity got the best of him. During the application for this masters scholarship, it became obvious that this funding wasn't going to be enough to cover his expenses.

MAPPING RIVERS IN NEW ZEALAND

About to abandon the idea of studying in New Zealand and commence graduate studies at CSU, the advisor who had advertised the program at the University of Canterbury suggested that Javernick skip masters-level work and go directly into doctoral work. He applied for doctoral studies, and received a larger scholarship. Henceforth, he and his wife began packing their bags for a three-year stay in New Zealand.

For his doctoral studies, Javernick was given an opportunity to design research around flood events on the Ahuriri River, one of the last fully unregulated rivers in New Zealand. His work focused on understanding how rivers naturally regulate vegetation through their own flood events. “What

was really exciting about my studies is the multidisciplinary approach that I took,” Javernick says. “Rather than conducting research on one minuscule subject in civil engineering, I focused on a broad issue that involved other disciplines of ecology, geography, and data science.”





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Mapping the rivers proved difficult. "Running simulations for rivers requires very good topography with detailed elevation data," Javernick observes. "To gather these data, researchers had to employ LIDAR—light detection and ranging from airplanes—which was very expensive." Drawing on his past aviation background and a suggestion by a co-supervisor, he pursued an untested alternative—taking hundreds of pictures 600 meters off the ground from a rented helicopter. He then triangulated these photos using special software to build

a full 3-D map. "We actually achieved better accuracy than what others were getting with LIDAR technology, though at a cost 10 times less than LIDAR," Javernick notes.

With these models in place, he and his colleagues could determine what would happen within rivers and their surrounding habitats once sediment started moving and how the topography might change based on this movement in combination with the velocity of the river. "This complicated modeling was quite unique and yielded data at costs that could not be attained previously," Javernick says.

MARIE CURIE FELLOWSHIP SPURS MORE

Javernick returned to Colorado in 2014 and took a job as a hydraulic engineer. In 2015, he accepted a new assignment with a company based in Hood River, Oregon. When his intellectual curiosity took over once more, he applied for (and received) a prestigious Marie Curie fellowship, which included an €80,000 stipend, at the University of Trento in Italy. He and his wife packed their bags to relocate to Europe.

For his fellowship work, Javernick leveraged mapping methods that he perfected during his studies in New Zealand. "We conducted numerous experiments with river vegetation," He explains. "The focus was to quantify river processes and the impacts of vegetation for the benefit of improved river management."

While researching he continued work for a company he and several colleagues had founded before he left. "We felt that drone technology could help lower the cost of water conservation projects and launched a company called Uviation that specialized in the use of drones to conduct research previously done via airplanes or helicopters," he relates. "While in Italy, we attained a FAA Section 333 permit to use drones for commercial purposes. After working with a few universities and projects, we concluded that the company, now known as WorldWater, would be best served as a nonprofit, enabling us to take research and technology out of university settings and apply it to real-life situations."

BACK TO CAÑON CITY, TECHSTART ENABLES SUCCESS

When it came time to return from Italy in the fall of 2017, Javernick and his wife didn't look very far—electing to settle in his hometown of Cañon City, Colorado. “We have deep roots in Fremont County,” he recalls. “It is a great place to live and raise a family.”

At first, the decision appeared to be ill-fated. Javernick's business partners for WorldWater Today lost interest in the venture, and he had to reconstitute the company as a River Science. “Upon returning from Italy, I spent the first three months traversing the state of Colorado building a network and trying to find business,” he says. It proved to be a long fall and winter; it wasn't until March 2018 that Javernick was able to land his first contract.

It was at this same time that Javernick was introduced to Fremont Economic Development Corporation's (FEDC) TechSTART. “We have two small children, and it is difficult to work from home,” he relates. “I was finishing up some articles from publication stemming from my fellowship and needed a quiet place to work. It was a Saturday, and I went to the library. It was closed for some reason, and a friend of my wife offered her office space in TechSTART. After working from his office for the day, I was sold on getting myself an office.”

“TechSTART has been an invaluable part of River Science's success,” Javernick recounts. “The initial six months in Cañon City were tough. The TechSTART community kept me going, helping to keep my spirits high while introducing me to a broader and broader network of people. We probably would have left Cañon City had it not been for TechSTART.”

The small project Javernick won in March turned into another small project—and another, each bigger than the last. “We have a great value proposition,” Javernick says. “In addition to our drone capabilities and breadth of research and data, we have developed very innovative IoT real-time data sensors that push data into GIS applications where we convert data into valuable information.”

River Science not only offers clients research findings that are more accurate and deeper than competitive organizations, but it does so at a cost that is less. “Historically, river conservation analysis has been at a steep cost,” Javernick relates. “To begin, we're a nonprofit and put all of our earnings back into research and new clients. But more so, we have created solutions that deliver better results at a much lower cost as compared to other options on the market.”



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BUILDING SUCCESS TAKES FLIGHT

As River Science's business has skyrocketed over the past year, Javernick has benefitted from TechSTART in numerous ways. “The conference rooms are great,” he says. “We use them regularly for meetings. We don't need offsites for business meetings, and they convey a level of professionalism that we want.”

“We have more work than I can handle—to the point that we need to begin bringing on employees,” Javernick explains. “And ironically, as some of our jobs are more extensive than what our drones can cover, we've mounted cameras on a plane, and I've taken up flying again as part of that undertaking.” Talk about things coming full circle—from Cañon City, to North Dakota, to Fort Collins, to New Zealand, to Fort Collins, to Oregon, to Italy, to Cañon City and each part of my work now incorporates some portion of my diverse education and interests.”



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science**