

# albertaviews



## Sandbox for Ingenuity

At Beakerhead science and art play together

Jay Ingram



Unexpected. Like a human-scale nest. Or a musical trip through the human brain. Or a sustainable Ferris wheel providing a gourmet food experience, or an outdoor theremin concert. Mix science, engineering and art and it seems inevitable that the unanticipated will emerge. That's what Calgary's Beakerhead festival is all about.

“It’s a celebration, a melting pot of human creativity, energy and problem-solving that destroys the lie that the cultures of art and science are at odds. If Pablo Picasso and Leonardo da Vinci formed a band with Stevie Wonder, it couldn’t have been better.”

That’s Mark Stevenson, British author, futurist and entrepreneur. He personified Beakerhead this year by turning scientific theories of humour into stand-up comedy at the Tremendous and Curious World of Beakerhead, headlining at An Optimistic Evening (based on his book *An Optimist’s Tour of the Future*) and speaking at Packing for a One-way Trip to Mars. And he felt at home throughout: “Beakerhead was a bit like walking around a theatre of my own obsessions. The greatest thing was the serendipity. You couldn’t turn around without bumping into someone, or something, that was surprising, invigorating and challenging—in all the right ways.”

Yeah? So what is Beakerhead, really? Its very diversity and unpredictability challenges anyone who would like to come up with a memorable, one-sentence title to explain it all. Calgary Mayor Naheed Nenshi calls it “Stampede for Geeks”; perfect for Alberta, but maybe not for the anticipated American tourists. At Beakerhead we like to call it “A mash-up of art, science and engineering.” I sometimes tell people: “If Discovery Channel’s *Daily Planet* had a street party, it would be Beakerhead.” It can also be a “sandbox for ingenuity.” But each of these is incomplete, at least partly because none emphasizes the “delight” that co-founder Mary Anne Moser so often cites. Beakerhead must be experienced.

Mary Anne and I founded Beakerhead in late 2007, but the details of the festival’s birth are somewhat vague, even in our own minds. Mary Anne recalls that the idea spun out of a notion of creating a large-scale science festival for Calgary. I was on board immediately, but before we were able to engage the broader community we had to come up with the name. That moment we do remember:

Mary Anne stops by Jay’s desk, and says “Beakerhead—that’s the name.”

“Okay.”

“Or Robertson…”

“After the screwdriver?”

“Yes.”

“No.”

“Okay, Beakerhead it is.”

I have spent 40 years persuading audiences that science, as it peels away the seemingly endless layers of nature, provides us with rich and enduring stories. Beakerhead promised to be an ambitious variant of what I’d already been doing. Those first conversations were at least partly shaped by Mary Anne’s and my experience running the Banff Science Communications Program, where we bring together 20 early- to mid-career scientists and science communicators for two weeks of intense work. We designed the program to emphasize action, not discussion. “Why talk about it (incessantly), when we can do it?” And “The only reason we’re not doing it is: We’re not doing it.”

We also knew we had something when we went to Burning Man in 2008, the desert event in Nevada where 50,000 devotees gather annually to live a different life for a while, surrounded by out-of-this-world works of art. Even though I was “working” there, wandering around interviewing people for *Daily Planet*, it was still intense—and oh so imaginative. We watched the ritual burning of the “man” from the deck of a jellyfish from the future; and of course there was a DJ on board. Delight at the unexpected; that was the feeling of Burning Man.

So with Burning Man, Banff and decades of effort figuring out the best ways to engage audiences in the sometimes opaque worlds of science and engineering, we started figuring out what we could do—and when. We came up with a lot of ideas that died on the vine, but we also created several hardy survivors. Those who attended Beakernight on the Stampede grounds last September were wowed by the flaming octopus, *El Pulpo Mecanico*. A familiar sight at Burning Man, *El Pulpo* made its first trip to Canada for Beakerhead 2014. It is an amazing machine: simultaneously threatening and welcoming, the product of junkyard/hoarder artists who are both serious and playful. Fearsome jets of propane flames at 2000°C blast from each of *El Pulpo*’s eight legs and head. Its eyes alternately bug out and retract. No beak for this

cephalopod; instead a fierce mouth with fangs. El Pulpo once was a 1973 Ford F250 4x4, but honestly, you could study it for hours and never realize that.

At a distance it's a powerful flame-throwing machine, the kind of art installation that allows you to warm your hands on a cool Calgary evening. But a close-up look reveals something much stranger. El Pulpo is covered with—in fact, is constructed of—odd combinations of muffin tins, aluminum pans, forks, pie pans and kitchen utensils of all kinds. Their ordinariness is their virtue. As designer and builder Duane Flatmo says, “Kids come up to it, look really closely and see things they are totally familiar with. And they realize that they too could build something like this—yes it's fantastical, but practical too.” And Duane knows kids like that. He was one, creating mini-dinosaurs out of chicken bones atop a base of mashed potatoes and gravy at the dinner table.

The public presentation of awesome things is the first important step. The next is to become involved, to build something, to make. More than one public figure fondly remembers school shop class (sometimes called “industrial arts”). In a 2012 Vancouver address to the American Association for the Advancement of Science, Mike Lazaridis of Blackberry fame, who created the Perimeter Institute for Theoretical Physics, reminisced about how he did two things at school: attended the most challenging physics classes and took apart and tinkered with the electronic equipment in the basement.

Matthew Crawford is a motorcycle mechanic, Ph.D. in political philosophy and author of *Shop Class as Soulcraft*. After referencing Heidegger's comment that the way we get to know a hammer is not by staring at it but by holding and using it, he writes, “If thinking is bound up with action, then the task of getting an adequate grasp on the world, intellectually, depends on our doing stuff in it.”

Industrial arts, meet Beakerhead. Instead of building one more spice rack that your mother will discreetly hide in that never-visited corner of the kitchen, add the artistic side and build a two-person, pedal-powered tortoise. With a paisley shell.

The thousands who revelled in the dancing, music, engineering, technology and, yes, propane consumption in the Stampede parking lot on that Saturday night were experiencing only one—albeit the most visible—layer of Beakerhead. There was much more.

The Giant Walkthrough Brain sold out Friday and Saturday nights at Telus Spark; the audience travelled through the virtual brain displayed on the giant screen, while I as tour guide was joined onstage by the driver, the five-person band The Free Radicals and an actor who plays Alois Alzheimer's first patient. The Hotchkiss Brain Institute, the department of computer science and the LINDSAY Project at the U of C provided an array of talent to create this.

Not everything is super-sized. In 2014 visitors could attend dozens of workshops, among them the Chemistry of Makeup, the Science of Memorizing Lines, To Space and Back with astronaut John Herrington (who also participated in a pan-Canadian 178-classroom live video conference) and Engineering a Better World: The Biosand Filter. Workshops and presentations (Speakerhead!) represent the public, informal side of Beakerhead's commitment to education, and this year every one reached capacity attendance.

In the schools, 20,000 students were involved in Beakerhead field trips or in-class work during the five-day event. Ten-thousand students from 42 Alberta schools participated in the Atomic 13 Ingenuity Challenge, where they combined art, science and engineering to explore the theme “Things are not what they seem.” More than 2,000 students visited Little Big Street, a display of artistic and technological variations on the theme of human habitation. And the Calgary Board of Education once again ran the Beakerhead Summer Intensive, a three-week course offering 10 students the chance to work with Beakerhead mentors and an artist to produce a work of engineered art.

On a smaller scale than El Pulpo, but just as important to the Beakerhead team, is the art car, Pavo Concertus—the musical peacock. Like El Pulpo, Pavo emerged from an unremarkable vehicle, a beat-up 1993 Mazda B2200 purchased for \$850 through Kijiji, and, like El Pulpo, it has been transformed and is

now an interactive, mobile, musical peacock (the name pays homage to the Indian peafowl, *Pavo cristatus*). The tail is a set of donated organ pipes; the eyes of this peacock's tail are circlets of LED lights. Play a G# on the keyboard perched behind the cab and only the eyes wired to G# light up.

The nine-person Pavo team, all University of Calgary grads and nearly all engineers, have not stopped refining Pavo since they began the build. The team stands behind the concept "start with an idea; ideas are bulletproof," but would also be quick to add that good ideas bring their less popular friend "work" with them—something north of 1,000 hours of labour have been poured into Pavo. Where did these people come from? Engineering student Isabel Chan recruited them "from the [U of C's] Solar Car team, people from musical theatre, mostly engineers or fabricators I had met at some point." That is a Beakerhead-ish mix, people who think the idea of building what Chan calls "a musical light-up peacock truck" is a worthy challenge.

There is huge potential here. Houston has an annual art car parade, and if University of Manitoba mechanical engineering professor Doug Ruth has his way, there will one day be an art car convoy converging on Beakerhead from engineering schools across the country.

The public education side of Beakerhead is not as familiar to Calgarians as the public entertainment, but of course there's crossover: I was stopped time and again on Little Big Street by teachers telling me how much their students had loved the experience. One of the attractive features of a Beakerhead approach to education is the acknowledgement that kids are not simple creatures who can be identified and streamed into "technical/mathematical" or "artistic." Most are both, and that combination should be encouraged and reinforced, not subdued.

Where do we go from here? We are only in our second year: course-correcting and refining what we are already onto is our main challenge. At the same time we cannot repeat, but instead must find other ways to educate and delight. Bring in more social roboticists like Marilyn Monrobot's Heather Knight, and more science buskers like Raj Bhardwaj and Darren Markland to engage passersby on Stephen Avenue with the thixotropic qualities of corn starch and water.

We have goals beyond that, but it is always enlightening to hear where other interested parties think we should go. Marjan Eggermont is associate dean of student affairs and a senior instructor in mechanical and manufacturing engineering at the U of C's Schulich School of Engineering. She has a masters in Fine Art and teaches design to first-year engineers: "It would be nice to make it an all-year program. We could create interdisciplinary courses involving different faculties, Beakerhead-style courses. It would be fantastic if engineering allowed for a minor in Beakerhead."

And although Mary Anne and I have always thought that Calgary, with its concentration of engineering know-how, a well-established "maker" culture and thriving cultural community, is the perfect home for Beakerhead, perhaps not surprisingly Mark Stevenson is looking beyond Calgary city limits: "We need a culture of unashamed optimism, of ambition, visioning and creative and co-inspirationally pragmatic problem-solving. Beakerhead should franchise its model to other cities. Beyond that I think it needs a year-round program of Beakerhead-y interventions and provocations—if we want to change culture, we need to be at it daily. A Beakerhead School strikes me as a rather good idea."

They say it better than I can. Everyone can build; everyone can be involved. It surprises many that engineering is a creative pursuit (though the engineers have known it all along). But bring together artists and engineers to strengthen the bond between the two activities and surely new works will be generated. And in the process we will delight and educate.

*Broadcaster and writer Jay Ingram co-founded Beakerhead in 2013. He was co-host of Discovery Channel's Daily Planet.*