When satellites capture retreating glaciers from hundreds of kilometres away, the images may be beautiful but they're removed from human experience. We live on the ground. Retreating glaciers are where you can see climate change as it happens.

What have scientists learned from your images?
In 2006, on the Greenland Ice Sheet, I met glaciologists who said that glaciers are big lumbering things that respond to climate change on a scale of decades or centuries. We have learned that glaciers respond hourly to atmospheric conditions. Our visuals also suggest that subglacial floods may trigger some of the bigger calving events. We have nearly a million pictures in the archive now, although there's a lot of analysis yet to do.

How do you fund the ice survey?
A significant part of our initial funding was from the Expedition Council at *National Geographic*. Nikon gave us hardware. By partnering with scientists, we got help from the US National Science Foundation and NASA. But most of the funding over the past five years has been from private donors. It has been an absurdly difficult project to run without 'big science' government-scale funding and logistical support.

Do you have a science background?
For my master's in geomorphology, I researched Colorado's Big Thompson River flash flood of 1976. But I would not presume to call myself a scientist. When I was finishing my thesis, I remember looking at a stack of manila punchcards and deciding that I'd rather see the world through a camera than through data analysis. The data are incredibly important, but my calling is to understand the world through art.

What next?
The underlying theme of my work is the collision between human needs and nature. I'd like to do more with energy, in part because my grandfather died in a Pennsylvania coalmine collapse. We worked in the Gulf of Mexico after the Deepwater Horizon oil spill and are documenting changes in forest cover in the Rockies. And I am trying to make the ice survey financially stable so that the cameras can keep going for a long time. I feel a tremendous obligation to preserve a pictorial memory of these vanishing landscapes for the people of the future.

INTERVIEW BY JASCHA HOFFMAN

PHYSICS

Modelling Feynman

Daniel Cressey marvels at a gleaming depiction of the subatomic by the world's leading information designer.

Before the explosion in 'infographics' describing everything from cocktail mixology to US health-care spending, there was Edward Tufte.

Tufte, a statistician, is perhaps the world's most celebrated information designer. In *All Possible Photons* at his Manhattan gallery, ET Modern, Tufte has unleashed his love of artistic explanation in a series of sculptures instantly recognizable to anyone with a passing knowledge of particle physics. Minimalist 'graphics' consisting of stainless-steel tubing formed into straight and undulating lines, Tufte's rendering of Feynman diagrams transforms recondite scientific notation into abstract, glinting art. Tufte also plans to show versions more than five metres high at his sculpture park in Woodbury, Connecticut.

US physicist Richard Feynman created elegant traceries of lines, dots and arrows to describe and predict how subatomic particles interact. Feynman was not unaware of his diagrams' aesthetic appeal, and famously drove a van painted with a selection of them.

Tufte's matt or polished steel sculptures, mounted on the walls, are shorn of explanations as well as much of the detail that makes them scientifically useful, such as arrows and labels. Some are large and dominate their wall space. The most powerful artwork on display is the collection of 120 smaller pieces that give the show its name — a cluster representing all possible space and time paths of a particular interaction of photons. These form what Tufte calls "a complete enumeration of everything that could happen" in that instance.

All Possible Photons: The Conceptual and Cognitive Art of Feynman Diagrams
ET Modern, New York.
Until spring 2013; official opening 15 September.

This isn't the first time Tufte has ventured into Feynman territory. The diagrams feature as models of good design in Tufte's book *Beautiful Evidence* (Graphics, 2006). They are also referenced in one of his enormous *Rocket Science* sculptures of fantastical space probes attached to giant bazooka-style launchers. In the *Airstream Interplanetary Explorer* (2011), the probe is an iconic silvery Airstream caravan adorned with Feynman diagrams. Tufte's contention is that because subatomic particles everywhere in the Universe behave as shown by Feynman diagrams, these could work as communiqués to other worlds. As he has put it, "Better the cosmopolitan verbs of Nature's laws on spacecraft than the local proper nouns of national flags, earthly Gods and Goddesses, and government agency logos."

By focusing on the diagrams alone, the sculptures in *All Possible Photons* bring home the power of Feynman's achievement. There is beauty in his diagrams, but the real deal is what they can potentially describe — which is everything. ■

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A. SEVERNY

Edward Tufte adjusts his *All Possible 6-Photon Scattering (120 Space-Time Feynman Diagrams)* (2012).