

Title Slide:

Today I'm going to tell you a little bit about a really incredible designer: Ben Fry. He is primarily a computational information designer—I'll be telling you what that is too. He has done design work in many fields, but for this talk I'll be focusing on his work in genetics.

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Researchers at USC recently decided to calculate humanity's total storage capacity—how information have stored on every piece of paper and every hard drive in the world. They came up with the number 295. 295 exabytes. That's equal to 295 million terabyte. Still, reading that number doesn't really help us understand the scale of this information: our brains are not wired to handle data on that scale.

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Though our brains can only handle about 30 pieces of information at once, our own genomes have 3 billion base pairs. : it would take 9.5 years to read the entire sequence of one person's genome aloud without stopping. Though a decade has passed since the entire genome was published, little progress has been made in using that information. A big reason that more hasn't come out of the Human Genome project is the sheer amount of data.

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So the question becomes, how can we make 3 billion data points more manageable? How can we present this information in a useful and accessible way? One way is with a picture: this is a browser for the human genome. It displays genetic data at three different levels. It displays the big picture and the fine details at the same time: a researcher can look at a single gene closely and see where it falls in the entire chromosome simultaneously. This is useful when you're looking for a single, small change that can make a huge change in a person's physiology.

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Ben Fry created that browser. He happens to be a CMU alumnus. He was a design major with a computer science minor when he was at CMU. Later, he studied at MIT.

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He got a PHD from MIT's Media Lab. His dissertation at MIT argued for the creation of the field of computational information design, bringing together the separate fields of information visualization, graphic design, and data mining into one discipline.

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He pioneered this entire field. Fry owns his own design firm and has created useful and beautiful visualizations of complex data. These are some designs that he has done involving genetics.

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Besides creating his own designs, Fry has opened up his field to a wide audience by building the open-source programming language processing, which is meant to make computation more accessible for visual designers, and to introduce programmers to design and data visualization.

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People have done some really remarkable things using processing. ON this slide you see a responsive touch display that runs processing code. The image that says Copenhagen is a map of all the negotiations that took place at the UN Climate Change conference in Copenhagen in 2009. Researchers in the humanities created visual representations of the plots of Shakespeare's plays by analyzing the text with processing.

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Nowadays much of the work people do looks something like this: people have to make leaps from data to conclusions and then somehow communicate those conclusions in an understandable way. Ben Fry's helps create bridges in these tasks: he makes tools that help people move from data to conclusions. He creates visualizations of data that help people find useful patterns. To make the leap from conclusions to communication, Fry incorporates the aesthetics of design into works of art that explain complex data.

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Data can be ugly, overwhelming, confusing. Who wants to spend their time staring at a spreadsheet? But data has patterns. And people enjoy finding patterns—it's how we understand things, putting together pieces of information to create a larger meaning. Humans are naturally pattern-seekers, and patterns are beautiful to us. Ben Fry's work as a designer is to uncover this beauty. He finds beautiful and useful patterns in data and shares them with the world.