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We Don't Understand Life... But We're Trying

An Interview with Professor Charles M. Boone, Molecular Biologist
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How are yeast cells used in genomic research?

We study yeast cells. It's a model for a human cell. It's more like a human cell than a bacterial cell, and we're trying to figure out the general principals of genetics that drive phenotypes in yeast. The reality is we don't understand how life works, and so we're trying to figure out fundamental things about life so that we can understand it, and manipulate it, if things go wrong like disease states. You can imagine if you can open up a cell, you'd see the inner workings, the plumbing of the cell. And if you don't understand it, you can't find out where the problem is, and you can't fix it. And so basically, that's what we're trying to do, is understand it to the point where we can fix things when they go wrong, and change things, manipulate them so that we can make things better.

What's happening in your field right now?

The yeast community is composed of about a thousand different labs around the world, and the community got together and made a mutation in every single yeast gene. Six thousand different genes on sixteen different chromosomes, and what we've been doing is using robots to cross all those mutants together and look at every single double mutant, so eighteen million double mutants, and so we've been mapping the connections between genes – the functional connections – that reveal the plumbing of the cell, reveal the wiring diagram of the cell, and it's just mind blowing. The amazing thing is now you can do that with CRISPR and in human cells and so we're working to start building these maps in human cells which will tell us how human cells work. The exploration is what drives a lot of science because we're moving into the unknown and it is sort of moving into an exponential phase, I think. We walk in, it's so exciting because you never know what's around that corner and what's going to happen next, and you just have to be prepared.