Robots build the cars we drive and the clothes we wear, but despite the magnificent proliferation of automation in the past millennium, robots don’t build our houses. In fact, outside of a few nifty power tools and new crane design, the construction industry has developed little innovation over the past few decades.

Behrokh Khoshnevis is about to change all that. An inventor, engineering professor and director of the Center for Rapid Automated Fabrication Technologies at the University of Southern California, Khoshnevis has spent the past 10 years perfecting Contour Crafting—his name for the world’s first completely automated homebuilding technology. Contour Crafting uses a computer-controlled robotic arm to deposit layers of concrete atop one another. Essentially, it’s the process of printing out houses, the way an ink-jet printer layers ink.

Khoshnevis’s eventual goal—which he says is about three years and $30 million in development money away—is the ability to print a single-family home, complete with plumbing and electrical systems, in about 24 hours. Even better, these homes will cost a quarter of what conventional houses cost. When coupled with microfinance systems already in place, it makes home ownership a possibility for virtually everyone.

The houses would not be just ugly boxes. As Scott Summit, an industrial designer and co-founder of Bespoke Innovations, explains, “What Dr. Khoshnevis has figured out is a way to 3-D print with concrete. But the beauty of that is complexity—meaning elegant geometries and individual artistry don’t cost more.” Three-dimensional printing is construction through accretion, so there’s little waste (itself a huge saving, since the U.S. generates an estimated 164 million tons of construction waste annually). You pay only for materials used.

“Contour Crafting is going to introduce a level of intelligence to architecture that is significantly more scalable and accessible than anything we’ve ever seen,” says Summit. And it’s not just single-family homes. Khoshnevis has already come up with designs for skyscraper-building robots. This means that those once impossible futuristic cities, with curved buildings and ridiculous skylines, are suddenly a very real possibility.
STEAK GROWN IN PETRI DISHES? MACHINES THAT CAN CREATE ORGANISMS NEVER BEFORE IMAGINED? TAKE A LOOK INTO THE (VERY NEAR) FUTURE

produced to fight rapidly mutating diseases such as AIDS, or one-of-a-kind medical treatments tailored to an individual’s DNA and disease.

But health care is only the beginning. Inventor Craig Venter, who has been accused of “playing God” for being the first to create a synthetic life-form with a DNA synthesizer, has partnered with Exxon Mobil in a $600 million project to create algae that turn carbon dioxide into gasoline using the machine. Also, as the human race begins to contemplate the setting of distant worlds, a DNA synthesizer is crucial to the process. Says Simon “Pete” Worden, director of the NASA Ames Research Center, “If you’re going to be someplace like Mars for a long time, then you have two choices for resources: Either you set up a very long supply chain with Earth—which probably isn’t feasible—or you bring along a DNA synthesizer, which allows you to do everything you need using raw materials found where you are.”

There is a potential downside to all this progress. A DNA synthesizer could make it easier for anyone—from curious teenagers to dangerous psychopaths—to create sinister biological organisms that have never before appeared on Earth—meaning that if you thought the anthrax scare was bad, just wait till you see what tomorrow might bring.

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INVENTING NEW SPECIES
HOW TO CONSTRUCT YOUR OWN LIVING, BREATHING, SYNTHETIC CREATURES

It has taken scientists centuries to understand the mysteries of DNA, the basic building block of life, which contains the genetic instructions that define each organism. Until recently, the furthest we had come in creating new DNA was gene splicing, essentially a cut-and-paste method of combining one organism’s DNA with another’s. The process is extremely difficult and prone to error. But what if there were a machine that could print out synthetic codes of DNA and create a new species in the process? There is. A DNA synthesizer allows would-be life hackers to modify existing organisms or build new ones.

Andrew Hessel, co-chair of Singularity University’s biotechnology and bioinformatics department, explains: “These devices can essentially combine A, C, G, T—the four bases that make up DNA—any order you want, with the ease of a word processor. This means there’s less of a need for expensive labs, and virtually anyone can entertain the idea of creating life from scratch.” The result? Revolutionary biological innovations in months rather than years, many by novices, at a fraction of the historical cost.

What are some innovations in the offering? Vaccines that can be quickly
It's a sunny Saturday, and Junior is driving me around Stanford University. He's a smooth operator—making sharp turns, avoiding pedestrians. This may not sound like much, but Junior's not your typical driver. Specifically, he's not human. Junior is a car: a 2006 Volkswagen Rassat Wagon, to be exact. More particularly, he is an autonomous vehicle, known in the industry as a "robo-car." Born by a team of Stanford brains, Junior has all the standards of a standard car, but he also has a Velodyne HDL-64E High Definition LiDAR sensor strapped to the roof—which costs $80,000 and generates 1.3 million 3-D data points of information every second. There's an omnidirectional video-camera system, five radar detectors, and one of the planet's most technologically advanced GPS systems (worth $150,000). From the passenger seat, the car looks almost normal, give or take a few foreign gizmos. Load in a destination, and off you go. The steering wheel turns, the brake pedal moves up and down, and there's no human intervention. Junior may sound pie in the sky for mass market, but advocates say robo-cars will be ferrying many of us here and there by 2020. Most major car companies have an autonomous car division, crafting future driverless cars right now.

The possibilities for military use are endless, but what of civilian life? You'll never have to fill your tank (whether with hydrogen, gas or solar-weathered electricity) because your car will take care of that for you while you sleep. During your commute you can nap or have sex with your girlfriend. And seriously, have you extra-after-work martinis, because you'll have the possibility. Junior could go over to the dark side, it is 90007 Junior has a big red panic button on the dashboard that immediately disconnects the robo-mechanics should the car get a case of road rage.

"WHEN SCIENCE MARRIES THE MUSE"
A SHORT LIST OF INCREDIBLE INVENTIONS CURRENTLY IN THE PIPELINE

LAB ON A CHIP: On Star Trek this gadget is called a replicator and a hundred device doctors use to collect bodily info, perform genetic tests and diagnose diseases almost instantly. "VIRTUAL REALITY: Imagine Modern NFL 2.0. You're in a 3-D environment on the field, holding the ball and facing down Ray Lewis."

GIANT GRAVEL BATTERIES: Huge gravel with stored electrical energy when the sun goes down or the wind stops blowing, making widespread solar and wind power a viable possibility.

INJECTABLE TISSUE ENGINEERING: Using sheets of stem cells, doctors could soon be able to repair damaged limbs and organs directly to the wound.

GRID TIE: The next-gen electrical grid will have digital meters (no more stranglers showing up to look in your window) and be smarter. Obama has announced $3.4 billion for smart grid tech.

IMPLANTABLE ELECTRONICS: Miniaature computer chips, such as in your body, will become as commonplace as a computer mouse, or latent to the human body.

SPACE RACERS: Why all that money buying people and resources when it's already available out there? That's what's in the pipeline.

BIOSIMULATION: Testing new drugs in computers instead of on humans could lead to clear results faster.

BEAMER: No more weighing down our rocket ships with fuel. We will beam power directly from satellites.

SMART AIRGUNS: With the ability to accurately shoot a bullet from a hand gun with the ability to disperse it without injury.

SMART BEEPS: All cars have a "beep" to "scream" but with no one home, it will have a more sophisticated ability to behave like a robo-car.

IN VITRO MEAT: ON THE MENU: STEAK GROWN FROM STEM CELLS

The meat industry is a disaster. Cattle are energy hogs, with the standard "beef ball" containing 18 percent of our planet's greenhouse gases—more than all the cars in the world. It is one of the leading causes of soil erosion and desertification. An even bigger issue is disease. Tightly packed herds are breeding grounds for pandemics. But with global demand for meat expected to double by 2050, the problem can get only worse. Unless something changes radically, Which it just might. There is already a solution. The bad news? No one knows what to do. It has no hands or feet. "In vitro meat" is the moniker du jour, and its "living flesh" to "sci-fi" sausage has been test-tasted around. Whatever you call it, the goal is to grow steak from stem cells harvested from cows. Start may be a while away. In 2010 scientists in the Netherlands turned pig cells into pork—though Mark Post, professor of physiology at Eindhoven University of Technology and the lead researcher on the project, says the meat is not quite ready for market. "Actual muscle has a protein content of about 98 percent," he says. "We're at 5 percent right now. What we created looks like a scallop. Past also says no one has yet tasted this particular scalp. Besides getting the texture right, there are other issues: how to scale up the bio-reactors (the containers in which the meat is grown), how to mimic the nutrient-delivery service that is the body's blood system. But scientists believe these problems are solvable. "Conventional ground beef will always be bad for you," 2005 says Jason Matheny, founder of New Harvest, a nonprofit research organization working to develop in vitro meat. "You can't turn a cow into a salmon, but cultured meat will allow us to do just that. With in vitro meat we can create a hamburger that prevents heart attacks rather than one that causes them."