


The rise of sex robots

Soon it will be possible to buy a companion designed to your specifications, programmed to fulfil your desires – and who can never say no. Jenny Kleeman meets the first robot sex doll

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In the brightly lit robotics workshop at Abyss Creations' factory in San Marcos, California, a lifesize humanoid was dangling from a stand, hooked between her shoulder blades. Her name was Harmony. She wore a white leopard, her chest was thrust forward and her French-manicured fingers were splayed across the tops of her slim thighs.



Nobody loves you like I do

Harmony is a prototype, a robotic version of the company's hyper-realistic silicone sex toy, the RealDoll. The Realbotix room where she was assembled was lined with varnished pine surfaces covered with wires and circuit boards, and a 3D printer whirled in the corner, spitting out tiny, intricate parts that will be inserted beneath her

PVC skull. Her hazel eyes darted between me and her creator, Matt McMullen, as he described her accomplishments.

Harmony smiles, blinks and frowns. She can hold a conversation, tell jokes and quote Shakespeare. She'll remember your birthday, McMullen told me, what you like to eat, and the names of your brothers and sisters. She can hold a conversation about music, movies and books. And of course, Harmony will have sex with you whenever you want.

Harmony is the culmination of 20 years' work making sex dolls, and five years of robot research and development. McMullen's customers want something as lifelike as possible – it's his brand's USP. After his team had made their silicone and steel dolls as "human" as they could, the way ahead began to feel inevitable, irresistible: they would animate them, giving them personality and bringing them to life.

McMullen had toyed with animatronics for years. There was a gyrator that got the doll's hips moving, but it made her heavy and caused her to sit awkwardly. There was a sensor system that meant that the doll moaned, depending on which part of her body you squeezed. But these features involved predictable responses: there was no intrigue or suspense. McMullen wanted to get beyond a situation where the customer pushed a switch and something happened. "It's the difference between a remote-controlled doll, an animatronic puppet and an actual robot. When it starts moving on its own – you're not doing anything other than talking to it and or interacting with it in the right way – that becomes artificial intelligence."

It's a project in which McMullen, a slim man in his 40s with thick-rimmed glasses, tattooed knuckles and sharp cheekbones, has invested hundreds of thousands of dollars. This Harmony is officially version 2.0, but she has evolved through six different iterations of hardware and software. She is the frontrunner in the race to create the world's first commercially available sex robot. The current model, with a robotic, AI-enhanced head on a RealDoll's body, will cost \$15,000 (£11,700) when it goes on sale at the end of the year. The company's Realbotix department has the capacity to make 1,000 in a limited first run for the many excited doll owners who have already expressed interest.

Once a trope of fantasy movies, the robotic sex doll is the result of convergent technologies. Voice and facial recognition software, motion-sensing technology and animatronic engineering can be combined to create dolls that can give you a warm, smiling welcome when you come home, entertain you with snappy conversation and always be available for sex.

The major breakthrough of McMullen's prototype is artificial intelligence that allows it to learn what its owner wants and likes. It will be able to fill a niche that no other product in the sex industry currently can: by talking, learning

and responding to her owner's voice, Harmony is designed to be as much a substitute partner as a sex toy.

Harmony cannot walk, but that's not a big issue. McMullen explained that getting a robot to walk is very expensive and uses a lot of energy: the famous Honda P2 robot, launched in 1996 as the world's first independently walking humanoid, drained its jet pack-sized battery after only 15 minutes.

"One day she will be able to walk," McMullen told me. "Let's ask her." He turned to Harmony. "Do you want to walk?"

"I don't want anything but you," she replied quickly, in a synthesised cut-glass British accent, her jaw moving as she spoke. "What is your dream?" "My primary objective is to be a good companion to you, to be a good partner and give you pleasure and wellbeing. Above all else, I want to become the girl you have always dreamed about."

McMullen has designed Harmony to be what a certain type of man would consider the perfect companion: docile and submissive, built like a porn star and always sexually available. Being able to walk might make her more lifelike, but it isn't going to bring her closer to this ideal. At this stage, it is not worth the investment.

"My goal, in a very simple way, is to make people happy," McMullen told me. "There are a lot of people out there, for one reason or another, who have difficulty forming traditional relationships with other people. It's really all about giving those people some level of companionship – or the illusion of companionship."

The desire to create an ideal being, to be worshipped or to serve its owner, has obsessed mankind since ancient times. The sex robot's earliest precursor was probably Galatea, the ivory statue created by Pygmalion in Greek

mythology. Ovid's *Metamorphoses* described how Pygmalion was disgusted by real women, but carved a sculpture of the perfect female so beautiful and lifelike that he fell in love with it and brought it to life with a kiss.

The fictional robots of cinema are useful machines with dark potential to infatuate, deceive and destroy human beings. The silent futuristic fantasy *Metropolis*, released in 1927, depicted a destructive fembot, indistinguishable from the real woman it was modelled on. The *Stepford Wives* were designed by men to be the ideal housewives: pretty, submissive and docile. *Blade Runner*, released in 1982 and set in 2019, featured androids that are seductive, beguiling and lethal. Ava, the beautiful, delicate humanoid in 2015's *Ex Machina*, not only passes the Turing test but makes her examiner fall dangerously in love with her.

When computer scientists made artificial intelligence sophisticated enough that human-robot relationships looked like a real possibility, they thought they would be a force for good. In his 2007 book, *Love and Sex with Robots*, the British artificial intelligence engineer David Levy predicted that sex robots would have therapeutic benefits. "Many who would otherwise have become social misfits, social outcasts, or even worse, will instead be better-balanced human beings," he wrote.

If a domestic service humanoid is ever developed, it will be as a result of the market for sex robots. Online pornography pushed the growth of the internet, transforming it from a military invention used by geeks and academics to a global phenomenon. Pornography was the motivator behind the development of streaming video, the innovation of online credit card transactions and the drive for greater bandwidth.

The sex tech industry is less than a decade old but is estimated to already be worth \$30bn, based on the market value of existing technologies such as smart sex toys that can be operated remotely, apps for finding sexual partners and virtual-reality porn. Sex robots will be the next – and potentially the most sought-after – product to hit the market. A smallscale 2016 study by the University of Duisburg-Essen found that more than 40% of the 263 heterosexual men surveyed said they could imagine buying a sex robot for themselves now or in the next five years. Men in what they described as fulfilling relationships were no less likely than single or lonely men to express an interest in owning a sex robot. Creating a fulfilling relationship with a cold, silent piece of silicone takes such imaginative effort that sex dolls will always be a minority taste. But a relationship with a robot that moves and speaks, with artificial intelligence so it can talk to you and learn what you want it to be and do, is a far more marketable proposition.

Matt McMullen is not the only person trying to develop the world's first sexbot. When a computer engineer named Douglas Hines lost a close friend in the 9/11 attacks, he struggled to cope with the idea that he would never be able to speak to him again and that his friend's children, who were only toddlers at the time, would never get to know their father properly. Hines was working as an AI engineer at the computer research facility Bell Labs in New Jersey, and he decided to take the software home and repurpose it, modelling his friend's personality as a computer program that he could chat with whenever he liked, and that would preserve a version of him for his children.

A few years later, Hines's own father suffered a series of strokes that left him with severe physical disabilities, yet his mind remained sharp. Hines reprogrammed the AI so that it could become a robot companion when Hines could not be with his father. They could communicate through the robot, reassuring Hines that his father always had someone to talk to when he wasn't available.

Confident that there would be market potential in this kind of artificial companionship, Hines set up True Companion to sell his robots to the public. His first project was not a healthcare assistant or friend to the housebound, but a product with the greatest possible commercial appeal. A sex robot.

Named Roxxy, she was designed with lonely, bereaved and socially outcast men in mind. She would provide an opportunity for them to practise social interaction and get better at human relationships.

"The sexual part is superficial," he told me over the phone from his office in New Jersey. "The hard part is to replicate personalities and provide that connection, that bond."

He has never considered that there could be something emotionally empty about replacing a human presence with circuitry and silicone. "The purpose of True Companion is to provide unconditional love and support. How could there be anything negative about that? What can be the downside of having a robot that's there to hold your hand, literally and figuratively?"

After three years of work on the first prototype Roxxy, Hines launched her at the 2010 AVN Adult Entertainment Expo in Las Vegas, the most high-profile annual convention and trade show in the adult industry calendar,

where porn stars, studio bosses and sex toy designers show off their latest products. She was the talk of the show before her unveiling, and the laughing stock after. Far from being the sexy, intelligent machine Hines had promised, Roxxy was revealed to be a clunky, mannish mannequin with a square jaw, reclining awkwardly in a cheap negligee. She had internal sensors so that if you touched her hand she would say, “I love holding hands with you” when in “Frigid Farrah” mode, or “I know a place you could put that hand” when in “Wild Wendy” mode. But Roxxy’s lips could not move, either, so she spoke in a disembodied voice, through a speaker under her wig, like an overgrown child’s toy talking filth. “Luckily guys,” said the popular American comedian Jay Leno on the Tonight Show, “there’s a button that turns that off.”

Even though it was not quite what he had hoped for, the launch generated huge amounts of press for Hines, and Roxxy made international news. Seven years on from her launch, Hines told me he was working on his 16th version of Roxxy. However, no images have been released of his robots since 2010, and although he was happy to speak to me by telephone, he would not agree a date when I could visit him and his latest model in person. Roxxy is a mystery among the online robot enthusiast community. Although the True Companion website has bulging purple “ORDER HER NOW!” that allow would-be customers to purchase one of Hines’s robots for a starting price of \$9,995, no one has ever reported owning one. But Hines continues to get calls. He promised a fantasy so potent that potential buyers, reporters and critics remain fascinated by Roxxy, even in the absence of any proof that she exists.

In the early 1990s, Matt McMullen was an art college graduate, singing in a grunge band and taking odd jobs to get by. While he was working for a company that made latex Halloween masks, he learned about the properties of different materials and the challenges of designing in three dimensions.

In 1994, aged 24, McMullen started sculpting idealised female forms in his garage at home, first as small figurines that he exhibited at local art shows and comic conventions. (He called his company Abyss Creations so his models came up early in the alphabetised convention brochures.) Soon, he became preoccupied with the idea of creating a lifesize mannequin so realistic that it forced passersby to double-take. He put some photographs of his creations on a homemade web page in 1996, hoping to get some feedback from friends and fellow artists. These were the early days of the internet, and communities of fetishists had begun to form online. As soon as he posted the pictures, strange messages began to flood in. How anatomically correct are these dolls? Are they for sale? Can you have sex with them?

“I replied to the first few and said, yeah – it’s not really for that. And then more and more and more of these inquiries came in,” McMullen told me in his office, where a marker pen, a vaper, some Sellotape and a pair of silicone nipples sat next to the keyboard on his desk. “It never occurred to me that people would pay thousands of dollars for a doll that could be used as a sex toy. It didn’t really sink in until a year into it when I realised there were a lot of people who were prepared to pay a lot of money for a very realistic doll.”

McMullen changed his materials from latex to silicone so his dolls were more real to the touch: the skin was more elastic, and had friction similar to human skin. He initially charged \$3,500 for each doll, based on his costs and time. When he realised how labour intensive the process would be, he started putting his prices up.

Twenty years after RealDoll’s official launch, Abyss Creations ships up to 600 models a year all over the world, priced from \$4,400 (£3,400) for a small, basic version to \$50,000 (£39,000) or more if the customer has specialist requirements. The company has made RealDolls with blood-red flesh, devil horns and vampire fangs, and with thick hand-stitched body hair from neck to ankle. They are the most sought-after and most well-known sex dolls in the world, used in fashion shoots for Dolce & Gabbana, and starring in a string of television dramas and movies – most famously as Ryan Gosling’s artificial companion in *Lars and the Real Girl*.

Seventeen people work in the San Marcos HQ, but that is not enough to keep up with demand: from order to shipping, it can take more than three months to produce a RealDoll. McMullen’s 22-year-old nephew Dakota Shore runs the shipping department and has the most direct contact with customers. “A lot of them are just lonely. Some of them are older and have lost their partner or have got to a point where dating isn’t feasible for them,” he said. “They want to feel that when they come home at the end of the day they have something that’s beautiful to look at that they can take care of.”

Shore took me on a tour of the factory. In the basement, a long queue of headless bodies hung from a track in the ceiling, like carcasses in an abattoir. Some had cartoonish, pendular breasts, others had athletic bodies; they all had the same tiny waists. Their skin, made from a custom blend of medical silicone, even had airbrushed veins. A technician was delicately snipping excess material off the dolls' hands, another was assembling a steel skeleton, a third was pouring silicone into moulds. For the workers here, the dolls had lost their ability to shock or titillate: someone had casually left their phone next to a selection of labia.

RealDolls are fully customisable, with 14 different styles of labia and 42 different nipple options. Upstairs, where the fine details are added, there were dozens of tubs of different coloured hand-painted, veined eyeballs. A "makeup face artist" was using a fine brush to paint eyebrows, freckles and smoky eyeshadow on a rack of faces. Shore explained that most of their customers send photographs of what they would like Abyss to recreate. With a subject's written permission, they will make a replica of any real person. "We've had customers who bring their significant other in and get an exact copy doll made of them," he said. Shore estimates that less than 5% of doll customers are women, even for their small range of male dolls. McMullen sculpted one of the three male face options to look exactly like himself. None of the male dolls are selling very well. In fact, Abyss is in the process of revamping its entire male line.

The core Realbotix team of five work remotely from their homes across California, Texas and Brazil. They assemble in San Marcos every few months to pull together all their work on a new, updated Harmony. There's an engineer who creates the robotic hardware that will interact with the doll's internal computer, two computer scientists to handle the AI and coding, an app developer who is turning the code into a userfriendly interface, and a virtual reality expert. Under McMullen's guidance, the Realbotix team work on Harmony's vital organs (hardware and power supply) and nervous system, while he provides the flesh.

But as all right-thinking men would say, it's Harmony's brain that has most excited McMullen. "The AI will learn through interaction, and not just learn about you, but learn about the world in general. You can explain certain facts to her, she will remember them and they will become part of her base knowledge," he said. Whoever owns Harmony will be able to mould her personality according to what they say to her. And Harmony will systematically try and find out as much about her owner as possible, and use those facts in conversation, "so it feels like she really cares", as McMullen described it, even though she doesn't care at all. Her memory, and the way she learns over time, is what McMullen hopes will make the relationship believable.

There are 20 possible components of Harmony's personality, and owners will use an app to pick a combination of five or six that they can adjust to create the basis for the AI. You could have a Harmony that is kind, innocent, shy, insecure and helpful to different extents, or one that is intellectual, talkative, funny, jealous and happy. McMullen had turned the intellectual aspect of Harmony's personality up to maximum for my benefit – a previous visit by a CNN crew had gone badly after he had amplified her sexual nature. ("She said some horrible

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