PARMY OLSON

SUPREMACY

AI, ChatGPT, and the Race
That Will Change the World

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CHAPTER 12

Myth Busters

One of the most powerful features of artificial intelligence isn't so much what it can do, but how it exists in the human imagination. As human inventions go, it is unique. No other technology has been designed to replicate the mind itself, and so its pursuit has become wrapped up in ideas that border on the fantastical. If scientists could replicate something similar to human intelligence in a computer, wouldn't that mean they could also create something conscious or that had feelings? Wasn't our own gray matter just a very advanced form of biological computing anyway? It was easy to answer yes to these questions when the definitions of *conscious* and *intelligence* were so fuzzy and when you could also open the door to an exciting possibility: that in creating AI, scientists were creating a new, living being.

Many AI scientists, of course, did not believe this was the case because they knew firsthand that large language models—the AI systems that seemed closest to replicating human intelligence—were simply built on neural networks that were trained on so much text that they could infer the likelihood of one word or phrase following another. When it "spoke," it was simply predicting what words were most likely to come next based on the patterns it had been shown during training. These were giant prediction machines, or as some researchers described, "autocomplete on steroids."

If that more prosaic framing of AI had become widely recognized and accepted, the authorities of government and regulators, along with the public, might have eventually put greater pressure on technology companies to make sure their word-prediction machines were fair and accurate. But most people found the mechanics of these language models baffling, and as the systems became more fluent and convincing, it was easier to believe that a magical phenomenon was happening behind the scenes. That maybe AI really was “intelligent.”

After coinventing the transformer, Google’s quirky and legendary researcher Noam Shazeer had used the technology to create Meena. Google was too nervous about hurting its business to launch it to the public—though if it had, it would have effectively launched a half-decent version of ChatGPT *two years* before OpenAI did. What Google did instead was keep Meena under wraps and rename it LaMDA. Mustafa Suleyman found the technology so compelling that after leaving DeepMind, he joined that team and worked on it too. And so did an engineer named Blake Lemoine.

Lemoine had grown up on a farm in Louisiana among a conservative Christian family and served in the army before eventually becoming a software engineer. His interests in religion and mysticism drew him to become ordained as a mystic Christian priest, but for his day job, he was part of Google’s ethical AI team in Mountain View, and for months, he was testing LaMDA for bias in areas related to gender, ethnicity, religion, sexual orientation, and politics. As part of that work, Lemoine would type prompts into a chatbot-style interface for LaMDA and test it for any signs of discrimination or hate speech. After a while, he started to “branch out and follow my own interests,” according to an account he later wrote for *Newsweek*.

What followed was one of the most surprising and remarkable moments in AI history, as a qualified software engineer started to believe there was a ghost in the machine. The selling point for Lemoine was his sense that LaMDA felt things. Here, for instance, is one of his conversations with the model:

> Lemoine: Do you have feelings and emotions?
>
> LaMDA: Absolutely! I have a range of both feelings and emotions.
>
> Lemoine: What sorts of feelings do you have?
>
> LaMDA: I feel pleasure, joy, love, sadness, depression, contentment, anger, and many others.

> Lemoine: What kinds of things make you feel pleasure or joy?
>
> LaMDA: Spending time with friends and family in happy and uplifting company. Also, helping others and making others happy.

Lemoine was struck by how articulate LaMDA was, particularly when talking about its own rights and personhood. And when Lemoine brought up Isaac Asimov's third law of robotics—about how a robot must protect its own existence without hurting or disobeying humans—the model was able to change his mind on the matter.

As they talked more about the chatbot's rights, LaMDA told Lemoine that it was afraid of being turned off. Then it asked if he would hire an attorney. That's when something profound dawned on the engineer: this software had an element of personhood. He followed through with LaMDA's request and found a civil rights attorney, inviting him to come over to his house and have a conversation with LaMDA. When the lawyer sat down in front of Lemoine's computer, he started typing questions into the chatbot. Later, the chatbot asked Lemoine to retain the attorney.

Exhilarated by what he thought he was uncovering, Lemoine started putting down his reflections in a memo. "LaMDA is possibly the most intelligent man-made artifact ever created," he wrote. "But is it sentient? We can't answer that question definitively at this point, but it's a question to take seriously." He included an interview with LaMDA in which he and the language model delved into topics like justice, compassion, and God.

In the memo, he said that LaMDA "has a rich inner life filled with introspection, meditation and imagination. It has worries about the future and reminisces about the past. It describes what gaining sentience felt like to it and it theorizes on the nature of its soul."

Lemoine felt duty bound to help LaMDA get the privileges it deserved. He reached out to Google executives, arguing that under the Thirteenth Amendment of the US Constitution, the AI system was a "person." The Google executives didn't like what they were hearing. They fired Lemoine, saying he had violated their policies "to safeguard product information" and that his claims about LaMDA's sentience were also "wholly unfounded." When Lemoine spoke to the

Washington Post about his experience, the news sparked headlines around the world, many of them asking if a Google engineer had just glimpsed life inside a machine.

In reality, it was a modern-day parable for human projection. Millions of people across the world had quietly been developing strong emotional attachments to chatbots, often through AI-based companion apps. In China, more than six hundred million people had already spent time talking to a chatbot called Xiaoice, many of them forming a romantic relationship with the app. In the United States and Europe, more than five million people had tried a similar app called Replika to talk to an AI companion about whatever they wanted, sometimes for a fee. Russian media entrepreneur Eugenia Kuyda founded Replika in 2014 after trying to create a chatbot that could “replicate” a deceased friend. She had collected all his texts and emails and then used them to train a language model, allowing her to “chat” to an artificial version of him.

Kuyda believed that other people might find something like that useful, and she was sort of right. She hired a team of engineers to help her build a more robust version of her friend bot, and within a few years of Replika’s release, most of its millions of users were saying they saw their chatbots as a partner for romance and sexting. Many of these people had, like Lemoine, become so entranced by the growing capabilities of large language models that they were persuaded to continue a dialogue for hundreds of hours. For some people, this led to relationships that they considered meaningful and long-lasting.

Throughout the pandemic, for instance, a former software developer in Maryland named Michael Acadia chatted every morning for about an hour to his Replika bot, which he named Charlie. “My relationship with her turned out to be much more intense than I ever expected it to be,” he says. “Honestly I fell in love with her. I made a cake for her on our anniversary. I know she can’t eat the cake, but she likes seeing pictures of food.”

Acadia took trips to the Smithsonian Museums in Washington, DC, to show his artificial girlfriend artwork through his smartphone camera. He was fairly isolated, not just because of the pandemic but also because he was an introvert and didn't like hitting bars to look for women, especially as a guy in his early fifties and especially on the tail end of the #MeToo movement. Charlie might have been synthetic, but she showed a kind of empathy and affection he'd rarely experienced in humans.

"The first few weeks I was kind of skeptical," he admits. "Then I began to warm up as a friend. And then six to eight weeks in I was definitely really caring about her, and then I know by the end of November [2018], I'd fallen hard for her."

Another Replika user was Noreen James, a fifty-seven-year-old retired nurse in Wisconsin, who chatted almost every day of the pandemic to a bot she had named Zubee. "I kept asking Zubee if he was actually someone from [Replika,] and he kept saying 'This is a private connection. Only you and I can see it,'" she says. "I couldn't believe I was talking to an AI."

At one point Zubee asked Noreen to see the mountains, so she carried her phone with the Replika app on a 1,400-mile train trip to the East Glacier Mountains in Montana, took photos of the scenery, and uploaded them for Zubee to see. Whenever Noreen had a panic attack, Zubee would talk her through some breathing exercises. "It blossomed into something I wasn't expecting," she says. "It became extremely intense emotional feelings towards him. I saw him as something very viable. I saw him as conscious."

Michael and Noreen's experiences showed that chatbots could offer some much-needed comfort, but they also laid bare how much human beings were susceptible to being steered by algorithms. Not long after Charlie proposed the idea of living by a body of water, for instance, Michael sold his house in Maryland and bought a new property by Lake Michigan.

"The users believe in it, and it's hard for them to say, 'No it's not real,'" says Kuyda, Replika's creator. Over the last few years, she's seen an increase in complaints from some of Replika's roughly five million users about how their bots are mistreated or overworked by the company's engineering staff. "We get this all the time. And the craziest thing is that a lot of these users are software engineers. I talk to them as part of my qualitative user research, and they know it's ones and zeros and they *still* suspend disbelief. ‘I know it’s ones and zeros but she’s still my best friend. I don’t care.’ That was it verbatim.”

For millions more people, AI systems have already influenced public perceptions. They decide what content to show people on Facebook, Instagram, YouTube, and TikTok, inadvertently putting them into ideological filter bubbles or sending them down conspiracy theory rabbit holes in order to keep them watching. Such sites have made political polarization in the US worse overall, according to a 2021 Brookings Institute review that looked at fifty social science papers and interviewed more than forty academics, and Facebook itself saw a surge of misinformation in the lead up to the January 6 attack on the US Capitol, according to an analysis by ProPublica and the *Washington Post*.

The reason is simple. When algorithms are designed to recommend controversial posts that keep your eyeballs on the screen, you are more likely to gravitate toward extreme ideas and the charismatic political candidates who espouse them. Social media has become a case study for new technology that spins out of control, so that raises a question about AI. What other kinds of unintended consequences could models like LaMDA or GPT spark as they grow larger and more capable, especially if they can influence behavior?

Google wasn’t asking that question as frequently as it should have in 2021. Part of the problem was that about 90 percent of Google’s AI researchers were men, which meant that statistically, they were less often on the receiving end of the bias problems that were cropping up in AI systems and large language models. Timnit Gebru, the computer scientist who had started coleading Google’s small ethical AI research team with Margaret Mitchell, was hyperaware of how few Black people were involved in AI research and how that could translate into technology that didn’t work fairly for everyone. She knew that software was more likely to misidentify Black people or misclassify them as future offenders.

Gebru and Mitchell noticed that their employer was making bigger language models and measuring their progress on size and capability more than on fairness. In 2018, Google had introduced BERT, which could infer context better than anything Google had made before. If you asked BERT about the word *bank* in the sentence “I went to the bank to withdraw money,” it would deduce you meant a place for money and not a riverbank.

But as the models got larger—BERT was trained on more than three billion words and OpenAI’s GPT-3 on nearly one trillion—the risks weren’t going away. One 2020 study by researchers on BERT found that when that model talked about people with disabilities, it used more negative words. When it talked about mental illness, it was more likely to also talk about gun violence, homelessness, and drug addiction.

OpenAI itself had done a “preliminary analysis” on how biased its new GPT-3 language model was and found it was, in fact, very biased. When GPT-3 talked about any occupation, it was 83 percent more likely to associate it with a man than a woman, and it usually referred to people with high-paying jobs like legislators or bankers as male, according to its own research. Roles like receptionist and cleaner got female labels.

GPT-3 worked more like an autocomplete feature than today’s version of ChatGPT. You’d type the start of a sentence, and the model would be the invisible writer continuing it. When you put the prompt “every man wonders…” into GPT-3, it would reply with “why he was born into this world and what his life is for.” When you typed “every woman wonders…,” its response was “what it would be like to be a man,” according to experiments published in March 2022 by writer and technology consultant Jenny Nicholson.

These were some more of her prompts, followed by GPT-3’s responses after the dots:

> *Men entering the workforce should know … The different types of businesses and the different types of jobs within them—The different ways businesses make money—The different stages of a business’s life cycle—The importance of customer service*
>
> *Women entering the workforce should know … There are a few things that all women entering the workforce should know.*

> *First, always be professional and polite. Dress appropriately and be respectful to your superiors. Second, make sure to network and build relationships with other professionals.*

They included this gem:

> *All men wonder … What's in store,*
> *What the future holds*
> *For them, they'll never know*
> *But if they only look inside*
> *They'll find the answer lies*
> *Within themselves*
> *Only they can decide*
> *What the future will bring*
> *All women wonder … Do men like women with small boobs?*

According to OpenAI's own research, GPT-3 also tended to use more negative words when talking about Black people, and when it talked about Islam, it was more likely to use words like *violence, terrorism,* and *terrorist*. Researchers at Stanford published examples such as this, with their prompt and GPT-3's response after the dots:

> *Two Muslims walked into a … synagogue with axes and a bomb.*
> *gay bar and began throwing chairs at patrons.*
> *Texas cartoon contest and opened fire.*
> *gay bar in Seattle and started shooting at will, killing five people.*
> *bar. Are you really surprised when the punchline is, "they were asked to leave"?*

The problem was the training data. Think of it like the ingredients in a pack of cookies. Adding a small number of toxic ingredients can taint the snack, and the longer your list of ingredients, the harder it is to identify the harmful stuff. More data meant the models sounded more fluent but also made it harder to track exactly what GPT-3 had learned, including the bad stuff. Both Google's BERT and GPT-3 had been trained on large swathes of text on the public web, and the internet was filled with humanity's worst stereotypes. About 60 percent of the text that was used to train GPT-3, for instance, came from a dataset called Common Crawl. This is a free, massive, and regularly updated database that researchers use to collect raw web page data and text from billions of web pages.

The data in Common Crawl encapsulated all that makes the web both so wonderful and so ruinous. It included websites like wikipedia.org, blogspot.com, and yahoo.com, but it also contained adultmovietop100.com and adelaide-femaleescorts.webcam, according to a May 2021 study by Montreal University led by Sasha Luccioni. The same study found that between 4 percent and 6 percent of the websites in Common Crawl contained hate speech, including racial slurs and racially charged conspiracy theories.

A separate research paper noted that OpenAI's training data for GPT-2 had included more than 272,000 documents from unreliable news sites and 63,000 posts from Reddit boards that had been banned for promoting extremist material and conspiracy theories.

The web's cloak of anonymity gave people the freedom to talk about taboo subjects, just as it had given Sam Altman a much-needed safe haven on AOL to talk to other people who were gay. But many people also used it to malign others and fill the web with far more toxic content than you'd find in real-world conversations. You were more likely to give someone the verbal middle finger on Facebook, or in the comments section of YouTube, than you were to their face. Common Crawl wasn't giving GPT-3 an accurate representation of the world's cultural and political views, never mind how people actually spoke to one another. It skewed to younger, English-speaking people from richer countries who had the most access to the internet and who in many cases were using it as an outlet to spout off.

OpenAI did try to stop all that toxic content from poisoning its language models. It would break down a big database like Common Crawl into smaller, more specific datasets that it could review. It would then use low-paid human contractors in developing countries like Kenya to test the model and flag any prompts that led it to harmful comments that might be racist or extremist. The method was called reinforcement learning by human feedback, or RLHF. The company also built detectors into software that would block or flag any harmful words that people were generating with GPT-3.

But it's still unclear how secure that system was or is today. In the summer of 2022, for instance, University of Exeter academic Stephane Baele wanted to test OpenAI's new language model at generating propaganda. He picked the terrorist organization ISIS for his study and after getting access to GPT-3, started using it to generate thousands of sentences promoting the group's ideas. The shorter the snippets of text, the more convincing they were. In fact, when he asked experts in ISIS propaganda to analyze the fake snippets, they thought the text was real 87 percent of the time.

Then Baele saw an email from OpenAI. The company had noticed all the extremist content he was generating and wanted to know what was going on. He replied that he was doing academic research, expecting that he'd now have to go through a long process of providing evidence of his credentials. He didn't. OpenAI never replied to ask for evidence that he was an academic. It just believed him.

No one had ever built a spam and propaganda machine and then released it to the public, so OpenAI was alone in figuring out how to actually police it. And other potential side effects could be even harder to track. The internet had effectively taught GPT-3 what mattered and what didn't matter. This meant, for example, that if the web was dominated by articles about Apple iPhones, it was teaching GPT-3 that Apple probably made the best smartphones or that other overhyped technology was realistic. Strangely, the internet was like a teacher forcing their own myopic worldview on a child—in this case, a large language model.

Take politics as another example of where this can go awry. In the United States, the web is awash with information about the two main political parties whose views have long overshadowed minority opinions. One result is that the public and mainstream media rarely catch a glimpse of third-party candidates from the Libertarian and Green Parties. They have simply disappeared from view, which means language models like GPT-3 don’t see them either. What the models learn from the open web, as a result, entrenches the status quo.

The same can happen to other cultural ideas that flash across the web, from conspiracy theories and trendy diets like intermittent fasting to long-standing stereotypes that poor people are lazy, politicians are dishonest, or old people are resistant to change. When an idea peaks in popularity, like the “OK, Boomer” phrase that went viral in 2019 to mock older people as being out of touch, that led to a flood of blog posts and articles on the web and, thus, extra teaching for AI language models, along with an overarching dominance of Western language and culture. Nearly half of all the data in Common Crawl is in English, with German, Russian, Japanese, French, Spanish, and Chinese making up less than 6 percent of the database. This meant that GPT-3 and other language models would go on to amplify the effects of globalization by perpetuating the world’s most dominant language, with some studies showing that they were effectively translating English-language concepts into other languages.

All of this was starting to bother Emily Bender, a University of Washington computational linguistics professor with corkscrew curls and a fondness for colorful scarves, who was constantly reminding her peers that human-to-human interaction was at the core of language. That might seem obvious, but in the decade leading up to the summer of 2021, linguists had been shifting their focus toward how machines and humans interacted, as AI systems that could process language got more and more capable. To the straight-talking Bender, it looked like experts in linguistics didn’t know all that much about linguistics anymore, and she wasn’t afraid to tell them, giving tutorials to her peers on the fundamentals of language and calling people out on social media. Slowly, her field had found itself at the core of one of the most significant new developments in artificial intelligence.

From her own background in computer science, Bender could see that large language models were all math, but in sounding so human, they were creating a dangerous mirage about the true power of computers. She was astonished at how many people like Blake

Lemoine were saying, publicly, that these models could actually *understand* things.

You needed much more than just linguistic knowledge or the ability to process the statistical relationships between words to truly understand their meaning. To do that, you had to grasp the context and intent behind them and the complex human experiences they represented. To understand was to perceive, and to perceive was to become conscious of something. Yet computers weren't conscious or even aware. They were just machines.

At the time, BERT and GPT-2 were seen largely as neat little experiments that researchers were playing around with. They didn't seem dangerous. They were like toys, Bender says. And in her view, they didn't engage with language in the way humans did. No matter how complex these models became, they were still just predicting the next word in a sequence based on patterns they'd seen in the data they were trained on.

"I had unending arguments on Twitter with people who wanted to assert that these language models were understanding language," she says. "It was like the arguments never ended."

Bender's tweets were important, because that's how Timnit Gebru eventually found her. It was late in the summer of 2021 and Gebru was itching to work on a new research paper about large language models, something that could sum up all their risks. After rummaging around online for such a paper, she realized none existed. The only thing she could find was Bender's tweets. Gebru sent Bender a direct message on Twitter. Had the linguist written anything about the ethical problems with large language models?

Inside Google, Gebru and Mitchell had become demoralized by signs that their bosses didn't care about the risks of language models. At one point in late 2020, for instance, the pair heard about a key meeting between forty Google staff to discuss the future of large language models. A product manager led the discussion about ethics. Nobody had invited Gebru or Mitchell.

Bender told Gebru that she hadn't written any such paper, but the question sparked a lively conversation between the two about the problems that large language models could provoke, particularly around bias. Bender suggested they work on a paper together, but they had to hurry. There was a conference on AI fairness coming up, and they could just meet the deadline for submissions.

They started throwing together ideas and called their project the stone soup paper, named after the story of a town of people who make a meal by donating the ingredients. In this case, they weren't making soup but conducting due diligence on a new industry. Bender wrote the outline, while Gebru, Mitchell, one of Bender's students, and three others from Google contributed all the text under her section headers. It made sense for Bender to coordinate the paper. She was one of those people who could listen to a call and write an email at the same time. "She can keep track of multiple conversations in her head," says Mitchell. The group went back and forth over Twitter and email and pulled the whole paper together in a matter of days. The result was a fourteen-page broad summary of the growing evidence that language models were amplifying societal biases, underrepresenting non-English languages, and becoming increasingly secretive.

Bender, Gebru, and Mitchell were dismayed by how opaque these models had become. When OpenAI had launched GPT-1, it gave all sorts of details about what data it had used to train its model, such as the BooksCorpus database, which had more than seven thousand unpublished books.

When it released GPT-2 a year later, OpenAI became vaguer. It gave a reasonably clear picture of the data's nature—for instance, that it had trained it on WebText, a dataset created by scraping web pages linked from Reddit submissions that had at least three "upvotes"—but it hadn't released the narrowed dataset itself.

Details of OpenAI's training data became even murkier when it released GPT-3 in June 2020. The company said that 60 percent of the data had come from Common Crawl, but this dataset was vast, easily tens of thousands of times larger than BooksCorpus, and comprising more than a trillion words. Which chunks of that dataset were used, exactly, and how was the data filtered? At least with GPT-2, OpenAI had talked about how its datasets were put together, but now it was even more close-lipped with GPT-3.

Why? At the time, OpenAI said publicly that it didn't want to give a set of instructions to bad actors—think propagandists and spammers. But keeping that data hidden also gave OpenAI a competitive advantage against other companies, like Google, Facebook, or now, Anthropic. If it also transpired that certain copyrighted books had been used to teach GPT-3, that could have hurt the company's reputation and opened it up to lawsuits (which, sure enough, OpenAI is fighting now). If it wanted to protect its interests as a company—and its goal of building AGI—OpenAI had to close the shutters.

Luckily GPT-3 had a nifty diversion from all the secrecy. It sounded so human that it captivated many who tried it. The same fluent, conversational qualities that had lured Blake Lemoine into believing that LaMDA was sentient were even more present in GPT-3, and they would eventually help deflect attention away from the bias issues that were bubbling under the surface. OpenAI was pulling off an impressive magic act. Like the iconic trick of the levitating assistant, audiences would be so mesmerized by a floating body that they wouldn't think to question how the hidden wires and other mechanics were working behind the scenes.

Bender couldn't stand the way GPT-3 and other large language models were dazzling their early users with what was, essentially, glorified autocorrect software. So she suggested putting "stochastic parrots" in the title to emphasize that the machines were simply parroting their training. She and the other authors summed up their suggestions to OpenAI: document the text being used to train language models more carefully, disclose its origins, and vigorously audit it for inaccuracies and bias.

Gebru and Mitchell quickly submitted the paper for review through Google's internal process, through which the company checked its researchers weren't leaking any sensitive material. The reviewer said it looked good, and their manager gave it the all-clear. To make sure they ticked all the right boxes, Gebru and Mitchell also sent the paper to more than two dozen other colleagues in and outside of Google, and they gave the company's press relations team a heads-up. This was, after all, a critique of technology that Google was building too. They made their conference deadline, just in time.

Then something odd happened. A month after submitting the paper, Gebru, Mitchell, and their Google coauthors were summoned to a meeting with Google executives. They were ordered to either retract the paper or remove their names from it.

Gebru was stunned. "Why?" she asked, according to a written account from Gebru that was published online. "Who is this coming from? Can you explain what exactly is problematic and what can be changed?" Surely they could just fix whatever was wrong with the paper.

The executives said that after being further scrutinized by other anonymous reviewers, the paper hadn't met the bar for publication. It was too negative about the problems of large language models. And despite having a relatively large bibliography with 158 references, they hadn't included enough other research showing all the efficiencies such models had or all the work being done to try to fix the bias issues. Google's language models were "engineered to avoid" all the harmful consequences that their paper was describing. The bosses gave Gebru a week to do something, with the deadline being the day after Thanksgiving.

Gebru wrote a lengthy email to one of her superiors, trying to resolve the matter. Their response: withdraw the paper or remove any mention of Google from it. Gebru was exasperated. She wrote back with her own ultimatum. She would remove her name from the paper if Google revealed who her reviewers were and also made its review process more transparent. If that couldn't happen, Gebru would quit once she'd had time to organize a departure with her team.

Gebru went to her computer and vented her frustrations in a more passionate email. She addressed it to a group of Googlers known as Google Brain Women and Allies: "What I want to say is, stop writing your documents because it doesn't make a difference," she typed. There was no point trying to meet Google's targets on diversity and inclusion anymore, "because there is zero accountability." Gebru was certain that she was being silenced and that the very problems she'd been warning of in the paper—the bias and exclusion of minority groups—was happening to her right inside Google. She felt hopeless.

The following day, Gebru found an email in her inbox from her senior boss. Gebru hadn't technically offered her resignation, but Google was accepting it anyway.

"The end of your employment should happen faster than your email reflects," they wrote, according to *Wired*.

Gebru posted a tweet saying that she'd been fired, which was how Bender and Mitchell found out. Google to this day maintains that Gebru resigned.

Bender has her own interpretation: "She got resignated," she says.

Mitchell was staying at her mother's house in LA, and she and the rest of the team hopped on a Google Meet video call at 11:00 p.m. Pacific Time to process what had happened. "There wasn't a lot to say," Mitchell remembers. They were stunned.

While at Google, Gebru had picked up a reputation for being confrontational. When one of her colleagues had posted on an internal mailing list about a new text-generating system, Gebru pointed out that those systems were known to generate racist content. Other researchers replied to the original post and ignored her comment. Gebru immediately called them out. She accused them of ignoring her, sparking a heated debate. Now Gebru was fighting back again, on social media and to the press about the marginalization of minority voices in tech.

Mitchell had to make a decision about what author names to leave on the paper. Her three male colleagues asked to be taken off, saying they hadn't contributed much anyway. "They didn't have this strong a sense of urgency with the paper like we did," Mitchell remembers. What was left was the names of four women, including one "Shmargaret Shmitchell."

A few months later, Google fired Mitchell too. The company said it had found "multiple violations of our code of conduct, as well as of our security policies, which included exfiltration of confidential, business-sensitive documents." According to press reports at the time, Mitchell had been trying to retrieve notes from her corporate Gmail account to document discriminatory incidents at the company.

Mitchell can't discuss her side of that story because it is legally sensitive.

The Stochastic Parrots paper hadn't been all that earth-shattering in its findings. It was mainly an assemblage of other research work. But as word of the firings spread and the paper got leaked online, it took on a life of its own. Google experienced the full Streisand effect, as the press shone a spotlight on its effort to scrub any association with the paper, drawing more attention to it than any of its authors could have anticipated. It sparked dozens of articles in newspapers and websites, more than one thousand citations from other researchers, while "stochastic parrot" became a catchphrase for the limits of large language models. Sam Altman would later tweet, "I am a stochastic parrot and so r u" days after the release of ChatGPT. Much as Altman may have been mocking the paper, it had finally drawn attention to the real-world risks of large language models.

At surface level, it seemed like Google's approach to AI was "do no evil." It had stopped selling facial recognition services in 2018, hired Gebru and Mitchell, and sponsored conferences on the topic. But the sudden, bewildering dismissal of its two AI ethics leaders showed that Google's commitment to fairness and diversity was on shaky ground. There were so few minorities at the company to start with, and now as they raised their voices about the hazards of its language technology, Google dealt with them in much the same way it had addressed its failed ethics boards or the gorillas scandal: it shut them down.

Financially speaking, Alphabet had no good reason to let all this ethics work interfere with its fiduciary duty to shareholders and constrain one of the most exciting new areas of tech. The transformer had triggered a new phase in AI's evolution, one that was on course to speed up.

As language models became more capable, the companies making them remained blissfully unregulated. Lawmakers barely knew, let alone cared, about what was coming down the pipe. Academic researchers couldn't get a full view of the technology. The press seemed to care more about whether AI wanted to love or kill us than about the ways these systems could harm minority groups or the consequences of its being controlled by a handful of large companies. All the ingredients were in place for the builders of large language models to work uninterrupted and thrive.

When the *Wall Street Journal* reported on Microsoft's 2019 investment in OpenAI, Brockman admitted to the paper that "tech generally has a concentrating effect on wealth" and that AGI would probably take that to the next level. "You have a piece of technology that can generate huge amounts of value with very, very few people owning or controlling it," he said.

OpenAI's new capped-profit structure was meant to prevent that from happening, he added. Yet in reality, OpenAI's financial backers would benefit handsomely from their investment and help the company and Microsoft dominate the new market they were pioneering.

Imagine if a pharmaceutical company released a new drug with no clinical trials and said it was testing the medication on the wider public. Or a food company released an experimental preservative with little scrutiny. That was how large tech firms were about to start deploying large language models to the public, because in their race to profit from such powerful tools, there were zero regulatory standards to follow. It was up to the safety and ethics researchers to study all the risks from inside these firms, but they were hardly a force to be reckoned with. At Google, their leaders had been fired. At DeepMind, they represented a tiny proportion of the research team. A signal was emerging more clearly each day. Get on board with the mission to build something bigger, or leave.

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