

**BECOMING ROBOT-PROOF:**  
**BUILDING A WORKFORCE OF CREATIVE PROBLEM SOLVERS**  
Vivienne Ming

# Techno-utopianists claim that AIs will free everyone to be artists and doctors.

They imagine us freed of the burdens of paying rent and the need to take a job just for the paycheck, spending lives driven by purpose while solving the world's deepest problems. This is one of the most persistent and damaging myths about AI, "It will free us from drudgery, allowing us to focus on 'higher-value' tasks." The truth is that for the vast majority of the workforce the opposite occurs: automating the routine simply creates more routine. If AI isn't developed to explicitly empower creative work, and if people aren't developed to engage deeply with creative work, AI will never keep its promise.

Unfortunately, our schools and other social institutions aren't currently designed to produce a workforce full of problem solvers. Rather, it is much more likely that we would have a world in which the labor of some is worth more than an AI, but the labor of the vast majority is worth far less. What a profound divide that would be.

Many actually believe that automation will even bring gains to labor. They point out that while labor displacement by automation has happened frequently throughout history, it always created more jobs than it displaced. Textile manufacturing is a common example: automation turned a small-scale, highly-skilled craft into the massive industry we know today. But as many others before me have pointed out, artificial intelligence represents a fundamentally different form of automation. It's replacing not just physical labor but cognitive labor, and doing so at an increasing rate. These technologies are developing faster than our culture and institutions can adapt . . . and it isn't restricted to farms and factories.

## **IT'S NOT TECHNOLOGY VERSUS CULTURE**

Technology is changing faster than culture. As quickly as a new job appears, someone will create an AI to disrupt it. There is no room for culture to adapt to this unrelenting pace of change. But the solution is not to arbitrarily slow or restrict technology; frankly, it's not even clear that this is an option. Who could even enforce such an edict? Instead, two profound changes are necessary as we move forward. First, social institutions must keep pace. Our schools, governments, and markets must learn to adapt to this radically transformed world. They must keep pace with technological change and serve as a balance against it. Second, we must develop a healthier relationship with technology: one that puts our growth, rather than technology's growth, at the center.

To achieve these changes, conventional skills training is not enough. Research has shown, rather dramatically, that knowledge and skills—and the grades, test scores, and degrees associated with them—simply aren't predictive of employability and other life outcomes.

Yet schools and so many job training programs focus exactly on these: how to program, how to factor a polynomial, how to write a grammatically correct sentence, or how to sketch the human form. They are valuable skills, but only in the hands of someone empowered to make use of them. These are just the tools that craftsmen\* employ, not the craft itself. What predicts life outcomes is the quality of the craftsman. A large and growing body of research links success with qualities like general cognitive ability, metacognition, mindset, emotional regulation, and creativity. I call this collection of attributes *meta-learning*, the deeper abilities that enable learning itself.

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A further, fundamental problem is that no traditional tool is robot-proof. There is no routine skill or knowledge that we cannot eventually build an AI to perform more economically than a human. Tools neither differentiate people from one another nor protect them from technology. Even AI itself is just a tool. It is the world's most sophisticated hammer.

\* I have tried and tried to find a word better than "craftsman"—craftsperson . . . crafter . . . artisan . . . I'm as tired as anyone at having inherited a language that defaults to dudes, but apparently, every so often, I'd rather look good than feel good.

Instead of trying to guess which skills today's kids must know 20 years from now, we should build craftsmen who can master whatever tools they need. We should certainly teach our children hard skills—a craftsman without their tools is hobbled. But tools without a craftsman are pointless. To robot-proof our kids we must stop treating them as a list of skills on a resume and turn education toward developing the meta-learning that will produce a generation of craftsmen.

We should be judging people by what they build with their hammers, not by which brand of hammer they carry.

With AIs as our toolbox, the future of work is the hyperinflation of work: you'll show up in the morning, and it will be a different job by the end of the day. Any job changing slower than that quickly becomes one that can be done more economically by AI. The only job description of the future will be "creative, adaptive problem explorer," and every day brings a different problem (and it sounds damned exhausting). But imagine what a society full of such craftsmen could accomplish with a toolkit full of AI tools.

## **WE DON'T HAVE TO ACCEPT THE DIVIDE**

When my son was diagnosed with Type 1 ("juvenile") diabetes, my wife and I, both scientists, collected an enormous amount of data after we were discharged from the hospital. When we offered the data to the hospital staff during our follow-up appointment, they asked us to simplify it from 15,000 numbers to 15 so that the data would fit into the format they had been instructed to follow. They needed the data in a human scale that fit their particular tools; in this case, their tools were simply their eyes as they stared at those 15 numbers in order to develop a treatment plan.

Instead of 15 numbers on a xeroxed grid, the future of medicine is doctors deploying diagnostic AIs to analyze massive data sets from their patients more accurately and subtly than any human could. These future doctors would need to deeply understand their AI tools and why they produce the answers they do. Their job would now go well beyond diagnosing routine problems to being an expert guide providing insight and context to each other unique patient. Doctors as problem solvers would focus much more on metacognition, mindset, and emotional perception rather than on their own individual knowledge base or skill set.

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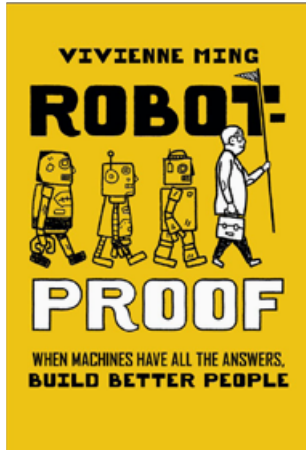
I am a huge advocate for the potential of artificial intelligence, machine learning (its dominant subfield), and even the eventual power of augmented intelligence and neuro-prosthetics. They are a foundational part of the world in which I want to live. If AI can diagnose cancers better than the average doctor, who wants to be the first person to die of a diagnosable disease just to keep humans in the loop? But if we respect the unique strengths each brings, the capabilities of doctors and AIs working together can far outstrip either alone. What could be accomplished if we truly were a society of AI-powered problem solvers, of craftsmen?

Becoming robot-proof is a human challenge, not a technological one. No one is going to stop the rise of AI. Instead, we need to match it with a rise in social institutions built on the core principle that everyone in the world can be amazing. But it still takes years, sometimes decades, to “build” an amazing person. If technology continues to outpace culture, the results will be catastrophic.

We don't have to accept that outcome. While there's no online course or six-week job retraining program for meta-learning, we do know how to develop it over time. We know how to build into kids a belief that their hard work will pay off. The irony is that the solution to humanity's place in a futuristic world of robots and AIs is as old as it gets. The meta-learning qualities that will make us robot-proof are the very same that predict positive life outcomes for both kids and adults today, and probably always have throughout human history. For all of that same history, though, it has been largely restricted to a privileged few. Now it must be brought to everyone. **The best way to robot-proof your kids is to make them all the more uniquely human.** 📖



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## ABOUT THE AUTHOR

Vivienne Ming, PHD, is a theoretical neuroscientist, entrepreneur, and self-described “professional mad scientist” who explores maximizing human capacity through the intersection of AI, neuroscience, and human potential. She is the co-founder and Executive Chair of The Human Trust, a nonprofit building AI foundation models to tackle problems ranging from individual disabilities to global economic inclusion. Her work has been featured in *The Financial Times*, *The Atlantic*, and *The New York Times*.

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