Academia Next

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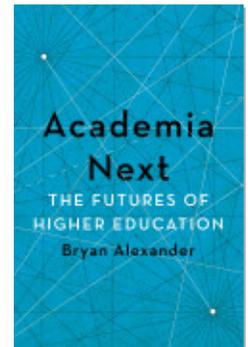➡ For additional information about this book

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To the Future and the Present

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14   Beyond 2035

Having covered the next decade and a half of American higher education, in this section we extend our analysis to encompass the subsequent postsecondary generation. In other words, we can attempt to forecast beyond 2035.

If exploring the near- and medium-term futures of colleges and universities is both daunting and requiring of extensive analysis, to attempt to look further ahead should inspire true humility. Starting with the largest possible scale of analysis—planetary civilization—involves modeling the possible effects of climate change, which already necessitates an enormous scientific endeavor. That research has established the likelihood of a 1- or 2-degree centigrade temperature rise over the next few decades, warming that could drive larger numbers of climate refugees to move across international borders. Similar movements over the past few years have already changed the face of politics in Europe; we can anticipate at least as much social and cultural stress on top of large-scale human suffering. This temperature rise is likely to trigger agricultural crises stemming from crop failures due to excessive warmth or encroaching aridification; that, too, could inspire political, economic, and social unrest. Anticipating and mitigating these possibilities—should a given polity decide to do so—then stimulate yet another level of political, economic, and social change.

Looking at change drivers for geopolitical structures and events other than those caused by the Earth's changing climate involves a

small galaxy of possibilities. We have touched on several of these throughout this book: the growing age gap between developed and developing nations; rising and unevenly distributed income and wealth inequality; the tension between those seeking to extend and deepen globalization versus neonationalists and localists; growing illiberalism in many political environments; areas of rising religious belief and practice versus regions of growing religious unaffiliation;[1] the battle between corruption and law enforcement; the continued struggle for women's rights; and traffic in multiple illegal substances. All of these challenges, and more, offer ways for shaking or reaffirming certain elements of the world order. Individual nations and regions provide myriad opportunities for change, too, from long-standing border tensions (Israel and its Arab neighbors; China and India; India and Pakistan) to political instability (sub-Saharan Africa, some of the Middle East) to transcontinental projects (China's One Belt One Road initiative). The number of possible alterations to the present-day political settlement ramify accordingly.

Alongside and intertwined with these forces is the ongoing technological revolution, a domain that offers yet another realm of colossal complexity. Attempting to forecast the digital world of 2035 from 2018, a gap of nearly twenty years, runs risks along the lines of anticipating the technological environment of 2018 from that of 2001. In 2001 most Americans were slow to imagine the mobile revolution, even while mobile phones swept the rest of the world. The dot.com bubble had just burst, which chastened many formerly expansive imaginings. Virtual reality of the 1990s had failed massively, and few saw it proceeding again. The Web was growing rapidly but remained largely in its noninteractive, document-centric mode; the more social, easier-to-publish environment of what would be dubbed "Web 2.0" was just beginning to surface.

If we wish to look beyond 2035, we would do well to augment our caution even further and imagine glimpsing 2018 from as far back as 1984. Visionaries of the Cold War's last decade did manage to foresee certain features of our time. Futurists like Alvin Toffler au-

gured a shift away from manufacturing and toward a postindustrial economy, which has largely transpired, at least in the developed world. Others focused on the looming threat of nuclear war. Most failed to pay attention to China's recovery from its cultural revolution and turn toward modified capitalism, which would become one of the great stories of our time.[2] Science fiction writers of the then-emergent cyberpunk school presciently envisioned a deeply networked future world dominated by large corporations and suffering from threats to civil liberties. But those writers largely missed mobile devices, tended to overstate the actual realization of artificial intelligence, and did not foresee the world-changing World Wide Web. Looking back at historical futuring gives us some retrospective caution in looking forward now.

Cautiously, we can suggest some technological possibilities based on the frameworks that seem most durable today and on extrapolating from some current initiatives. The fourth industrial revolution model, for example, posits continued movement away from a classic manufacturing-based economy and toward a society reshaped by multiple forms of new technologies, mostly automation from AI to robotics. There are many powerful forces driving such a transformation in the present, as discussed in chapters 4 and 5. There is a great deal of cultural and financial capital invested in this revolution.[3] Technological invention continues to progress. If we assume only incremental advances along these developmental lines, rather than chaotic disruptions, we should anticipate a transformed world, with a baseline of widespread do-it-yourself manufacturing, artificial assistants, use of robotics in professional and personal lives, and rich multimedia production and experience.[4]

We should also anticipate a range of cultural responses to a fourth industrial revolution. Automation alone offers multiple ways forward, assuming that set of technologies and practices succeeds on its own terms (and the possibility of a major automation crash is one we should anticipate). For example, we have already imagined, and are presently working toward, various forms of recapitulating a degree

of human identity in silicon. One concept involves starting from the mass of expressions a given person creates during decades of life—text messages, emails, phone calls, blog posts, Instagram photos, video appearances, and so on—then using software to determine that person's distinct style, their expressive voice, in order to repeat it after death in a kind of machine learning memorial. Extrapolated one step further, we can envision virtual advisors from the past who assist us in our work, or grief therapy programs based on living people interacting with mimetic forms of the deceased. Another concept sees software simulating a more generic or less representational human being, a virtual person living a digital life, which can then be put to various uses from study to work; with some degree of autonomy, such emulations could well develop their own societies.[5]

Looking at this historical transformation from political and economic perspective, our present political and social arrangements and the historical record of the first through third industrial revolutions offer several different civilizational reconfigurations, as Peter Frase and others have suggested.[6] If automation renders many jobs obsolete, human creativity could respond by creating new functions, jobs, and professions for carbon-based life to perform. After all, hardware and software need some degree of managing, and the social impacts of automation will transform current human needs while creating new ones, which emergent professions could meet. Alternatively, automation's successes may be limited to ways of assisting rather than replacing people, enhancing work rather than outmoding workers. In this future we could work closely with machines in some form of cyborg relationship, either literally through implants and ingested devices, or metaphorically, as we come to depend ever more intensively on software, data, networks, and hardware to perform our various tasks. Machines would closely empower our work and lives.

We can also imagine a socioeconomic elite powered by automation and related industries, dominating a society consisting largely of disempowered poor or working-class people kept in line through a mixture of rich entertainment and ubiquitous surveillance. This could

become something nearly medieval in scope, with a social base of impoverished techno-peasantry and a vanishingly small middle class above it. Social media by itself would perform that mixture of pleasant distraction and data-driven monitoring. Other technologies could be pressed into service: AI for more ambitious data mining, robotics as a police force, and tiny networked devices for extensive surveillance. From this future we would look back and see the early twenty-first-century dystopian literature wave and the warnings of Carr, Lanier, et al. as eerily prescient.

In a less dystopian version of this automated inequality world, most workers would be free from many historical drudgeries, thanks to automation's successes, and leading healthier lives. In fact, some futurists see such a world as one positively liberated by automation. This is where the idea of a universal basic income (UBI) enters discussions, based on various plans to guarantee all residents (or citizens, a crucial difference) of a given nation or region a sufficient cash transfer to maintain a basic existence. UBI proponents often pitch their idea as a response to automation's capacity to render human workers obsolete and the possibility that we will not generate new professions. The average work week may fall from the classic forty hours to thirty or twenty. Alternatively, more people may alternate periods of full-time employment with seasons of unemployment. A UBI system would tide people over these compensation shortfalls. Moreover, without an existential requirement to work for pay, some of us may choose to pursue nonremunerative tasks, such as writing a novel, learning a foreign language, spending more hours caring for loved ones, or conducting a religious pilgrimage. UBI could spark new human potential: quite the knock-on effect from automation's potential triumph.

Automation could yield another range of possible midcentury worlds, wherein devices and software progress even further, augmenting the world with a posthuman ecosystem. Imagine machines handling many of today's human tasks, but better: hauling cargo in redesigned vehicles, growing crops, diagnosing human and animal

illnesses, building colonies on Mars and the moon, performing surgeries, all more safely and efficiently than humans could do. Software produces nonfiction and creative art, manages the economy, patiently counsels and instructs humans. We have seen horrific versions of this in fiction, such as Karl Capek's human-exterminating robots (1920), the "benevolent" tyranny of *Colossus* (1970), and the genocidal Skynet from the *Terminator* movies (1984, 1991, 2003), but popular culture has also produced positive visions of a posthuman society, such as Iain Banks's far-future *Culture* sequence (1987–2012). These fictions offer much speculative material but also bring to mind a deep question: faced with being outmoded by our technological creations, either kindly or with chilly indifference, how would humans react, psychologically and culturally? Would we rage against these devices, as Victor Frankenstein snarled against his much more articulate monster? Or would we instead accept our new status and launch a society-wide vacation, like in the film *Wall-E* (2008)? This is a question the university is supremely well suited to explore, given the intellectual depth of our many disciplines. We can now imagine a curriculum based to some degree on the emergence of a new, posthuman age, and how history, computer science, sociology, literature, philosophy, and economics might teach it.

Yet we must be cautious about these visions of the middle of the twenty-first century, since they are based primarily on certain ways we might restructure our world based on only one technological domain, that of automation. Consider instead the possible futures driven by other technologies currently in development. If we start from biological applications, we find a Facebook team that seems to be making progress in developing a device to allow hearing-impaired people to experience audio communications as haptic vibrations, either returning to them the sense of sound or producing a new, sixth sense. How else might we enhance the lives of the disabled, or instead (or additionally) extend the range of human experience?[7] Research into brain science has allowed early methods of physically intervening in human cognition, leading to explorations of altering mental

states, connecting minds directly to computers, or linking minds together. A device to enable brains to control devices wirelessly is being tested.[8] The potential for torment and abuse here is vast, as are, once more, the possibilities for expanding what humans can do in the world, not to mention exploring the old dream of teaching by sending information directly into the brain, like Neo experiences in *The Matrix* (1999). Meanwhile, the long-running field of genetic engineering, frequently the source of dystopian imagination (*Gattaca*, 1997) and ethical conundrums, is developing new powers through CRISPR technology. We can, perhaps, redefine human and overall biological life on Earth. Add other technologies and practices to this mix—psychopharmaceuticals, advanced artificial limbs and organs, 3D printed anatomy, the Internet of things installed within bodies— and what it means to be a human being in 2045 would be a radically different question than it did when posed in 2018. Once more, what other institution is better positioned to guide us through such extraordinary challenges than the academy? And to what extent will colleges and universities shape such a future through research, producing technologies, practices, and concepts?

At the same time the biological world may be further inflected by changes in large-scale material science and new projects. Ever-shrinking computational devices may lead us to mobile and networked machines small enough to be ingested, that can conduct medical work on the human body. Even at scales larger than the dreams of nanotechnology, we can imagine transforming the physical world through the deployment of networked mites too small to be seen by the naked eye, perhaps leading to the advent of materials that can be addressed remotely or function autonomously, or "smart matter." 3D printing could reshape aspects of our built environment, as might the use of new materials, like strong and light graphene. New materials may well be needed, as currently under consideration for mitigating climate change are massive geoengineering projects, such as adding saline to an entire ocean, building region-scale seawalls, altering the planetary atmosphere's chemical composition, or installing a massive

shade in deep space between the Earth and sun. To reach space at all, we currently use rockets, the dangers of which have elicited experiments and designs for everything from reusable spacecraft to atmosphere-straddling space elevators. New entities are participating in a twenty-first-century space race that barely resembles that of the twentieth century: corporations, billionaires, and nations building programs for the first time. These potential innovations or transformations could affect higher education in multiple ways, starting with altering a campus's physical plant. College curricula and student career services would likely develop programs to support learners who seek to work in those new fields. The development of any or all of these projects will draw heavily on academic research and development. Further, many university departments will be able to contribute to the selection and critical assessment of such epochal projects, from political science to philosophy and sociology.

All these possibilities are based on trends that we can perceive in the present day. Meanwhile, beyond those evident change drivers, black swan possibilities also lurk. Historical examples abound, such as a leader's sudden death by accident or assassination that unravels a political order.[9] A new religious sect or the vigorous reformation of an existing faith can win adherents and upend societies. Beyond political and social causes, a pandemic that exceeds our medical containment capacity could not only constitute a humanitarian disaster but also sap regimes, shock economies, and electrify cultures. Conversely, a medical innovation might save or extend lives, such as a cure for congestive heart failure or a therapy that ends Alzheimer's. Many natural disasters have so far been handled without disruption by our current national and international systems, but larger-scale ones are possible and potentially devastating, such as cometary or asteroid impact. Climate change proceeds slowly, yet an unlikely and sudden shock, such as the Atlantic Ocean's thermohaline circulation system shutting down, could yield a range of powerful impacts. Because black swan events are by nature challenging to anticipate, we

may well be hit by a completely unforeseen development, one that to us in 2018 is a Rumsfeldian unknown unknown.

Our digital world may be especially vulnerable to these low-probability, high-impact events. A solar coronal mass ejection of sufficient size could damage networks and devices over a large geographical range. An electromagnetic pulse could remove a target completely from the Internet and the electrically connected world for a short period of time, leading to potentially catastrophic results. Imagine a city or state not only forced offline (no banking, email, documents, voice calls) but also cut off from electricity (no lighting, refrigeration, air conditioning, use of cars or aircraft). The immediate medical consequences are, to pick but one result, dire. Digital attacks conducted by national governments and their military or intelligence agencies (cyberwar), by organized crime, by other nonstate actors, or by future organizations could crash major networks. If any of these occur at sufficient scale, a social disaster could unfold, given the deep dependency we now have on the digital world. Amid all these possibilities, and in all humility, we must consider the ways higher education might develop after 2040.

The global postsecondary education market that evolved during the late twentieth and early twenty-first century may well persist or expand if globalization's drivers continue. The invention and promulgation of communication technologies as well as the movement of capital and (to a more regulated extent) population across national borders are poised to continue intertwining and interconnecting the human race. This trend creates the infrastructure to support transnational teaching and research while contributing to the rising expectation of learning that is borderless, or at least border-light. The demand for learning that cannot be met locally for a range of reasons grows a potentially planetary reach for American colleges and universities.

Alternatively, we could see that global educational wave recede under the impact of antiglobal cultural and political movements. It

is not a stretch to envision calls for something like postsecondary educational autarky, with leaders celebrating "American universities for Americans! American research for America—first!" Universities may decide to reduce foreign pedagogical entanglements for fear of national security compromises, suspicions of terrorism being spread or terrorists harbored, or because of international economic competition involving intellectual property. A wide range of stakeholders, from students' families to politicians to donors, could well make such a case quite forcefully.

Yet demographics may keep American colleges and universities within a global marketplace. If the fertility and lifespan trends we discussed in chapter 3 persist, campuses that choose to serve traditional-age students will have to expand their recruitment abroad. In particular they will have to focus on the dwindling number of nations that continue to produce large numbers of children, especially those in Africa. That continent is already on track to be the source of more than one-half of global population growth until 2050. After that point, "Africa will be the main contributor to global population growth."[10] Given the primary and secondary school challenges many African nations face, perhaps American universities will partner with African schools to enhance their educational offerings, while at the same time recruiting students for their campuses, either in the United States or elsewhere. At present some American colleges and universities collaborate with nearby and regional high schools in many ways. They have long provided teachers and administrators; now they also offer dual-credit courses that enrich the high school experience while providing additional college preparation to those students. We can imagine universities participating in intercontinental K–12 support and enhancement projects, possibly in concert with global nonprofits or the World Bank.

Such transatlantic outreach is by no means certain. American racism could stymie the recruitment of Africans. Logistical costs for basing recruitment in African nations may prove too much for many institutions to bear. Moreover, the demographic changes reshaping

the developed world may well give rise to a call for American women to have more children, which, if heeded, could yield a midcentury youth boom to rival the mid-twentieth century's baby boom.[11] I find scenario this unlikely. It would take an extensive, enormous, and unprecedented cultural upheaval to undo several generations of changes in women's lives at the scale needed to produce such a population shift. Absent that, the future of American higher education may well be found in Africa.

The planetary higher education world could change under the impact of developments from another continent. By the middle of the twenty-first century, China could well compete with the United States for the position of world academic leader. That nation has already made tremendous strides since the academic catastrophe that followed its cultural revolution. In terms of research, China has already become a technological powerhouse. It finally became a leading superconducting chip manufacturer after years of having to rely on the United States, South Korea, and, most embarrassingly, Taiwan.[12] In 2018 the nation passed one major milestone, when fifty-one of *Nature*'s one hundred worldwide "rising star" universities in the natural sciences were Chinese.[13] The combination of academic and industrial innovation has already positioned China as competing with the United States for leadership in quantum computing, robotics, and AI.[14] China is now aggressively expanding its influence abroad, most notably through the multicontinental One Belt One Road initiative.

We could imagine China outpacing the United States in the global education marketplace, especially if machine translation reduces the Chinese language barrier. Other factors would have to fall in line, too, such as the rest of the world coming to terms with Beijing's political surveillance and America failing to grow its research output. Alternatively, China's growth curve could reverse under the impact of multiple contingencies (the end of economic growth, domestic unrest, global dislike of digital authoritarianism, successful American geopolitical strategy). A transpacific academic competition between two postsecondary giants may frame the global development of

universities worldwide as well as form a major influence on American academia.

This combination of geopolitics and academia may surprise some readers, but it is not new. American higher education has long played a role in international relations, from serving as a base for academics fleeing Nazi Europe to conducting scientific and military research during the Cold War. As of this writing the post-9/11 War on Terror continues to be fought around the world, with multiple impacts on higher education; it is no imaginative stretch to see it persisting for years to come. Other international dynamics could connect with academia over the next generation. Think, for example, of the likely rush to exploit undersea resources that are now more accessible with the Arctic ice cap's retreat, which could elicit the expansion or development of new academic programs. Consider the rising tensions between the United States and Russia over multiple issues, which could lead to academic embargoes, the breaking up of scholarly partnerships, or perhaps the creation of a Moscow-centric and -friendly network of international universities.

Domestically, a range of political trends and events could adjust the contours of American higher education by midcentury. Economic politics have become more intense since the 1990s, especially after the 2008 financial crisis and the dissemination of recent research into income and wealth inequality. A rising political left, signaled by Occupy Wall Street and the 2016 presidential campaign of Bernie Sanders, could push for expanded public support for college tuition. At the same time, an elite whose wealth increasingly removes it from the rest of society may enjoy and support an ever more separate education system, from primary school through graduate programs. The combination could yield a class-based political polarization along the lines of the 1890s and the Progressive Era.

The anticipation of climate change's impacts could lead colleges and universities to take an active role in weather and oceanic mitigation. It could take the form of campus-built retaining walls and shelters for coastal institutions (recall how many American colleges

and universities are on the Atlantic and Pacific Seaboards). Alternatively, endangered campuses may choose to migrate inland and upward, away from rising tides and social upheaval.

Environmental pressures may drive a different set of social forces. The specter of vast amounts of waste products accumulating worldwide, from cities to oceanic garbage archipelagos, has drawn calls to rethink contemporary economics. Some have created models of a circular economy, where economic growth no longer occurs but currently existing materials are cannily reused and repurposed. Such a society would embrace an end to producing more, instead seeking to maximize what we already have. Similarly, the looming crisis of global warming has inspired others to embrace the idea of cutting back on carbon-spewing industrial production altogether, aiming for the idea of economic degrowth. Only through reducing economic output do we have a chance of repairing the damages wrought by the Anthropocene.[15] Obviously a turn to either reduced growth or the circular economy would cause vast social changes. Academia would not be immune, especially as many environmental and economic ideas emerge from universities. Institutional business models would have to shift in such a context. The way by which a degree constitutes preparation for a career would also be transformed.

Struggles over gender and racial inequalities could easily drive social and academic changes for the next two generations. As of this writing, progressive visions of gender and racial equity clash fiercely with opposition worldwide, from traditional societies to a wide range of conservative ideologies. Redefinitions of gender as social performance and in terms of nonbinary identity have prompted similar resistance. Governmental policies, social mores, and the lived practice of everyday life may all be contested, and their transformations drive further change. Higher education is naturally part of this process. Changing attitudes about gender and race play out across classes, research, and student life, while academia plays some role in influencing the broader social dynamics, sometimes as a thought or practice leader. Will higher education institutions differentiate themselves

from each other by their policies in this domain? To what extent will changing mores and politics drive further academic change?

Meanwhile, health care may loom ever larger as a social problem. We described one form of this in the Health Care Nation scenario, with an increasing amount of academia involved in the broader medial world. An alternative is possible, whereby allied health retreats as a giant influence. Automation may ultimately increase efficiencies and reduce costs. The Affordable Care Act may succeed in bending down the cost curve, especially if more states participate. A left-liberal drive aimed at providing Medicare for all could succeed, once younger generations supplant their elders in polling and donation. I can imagine an Ocasio-Cortez administration successfully implementing national health care, or shepherding through a set of medical practices that actually reduces costs. A small cultural revolution in favor of preventive medicine that reduces our demand on high-impact health services could happen without governmental intervention, perhaps following on our contemporary evidence-based medicine movement. And we should not rule out further revolutions in medical treatment that improve lives while reducing costs. The point is: educators should envision some end point to their health care expansion strategy.

All these forces could exert powerful influences on American colleges and universities, but we are not entirely passive. We can also transform ourselves. Academia is the repository of many brilliant minds equipped with well-trained imaginations. While academia is at times conservative, and we should expect a drive to keep as much of it intact as possible through midcentury challenges, the sector is capable of generating new forms. Consider how the second half of the twentieth century saw the massive invention of community colleges, federal guarantees for student loans, the development of many new academic fields, the switch of the majority of the professoriate from tenure-track to contingent faculty, the emergence of a nationwide student movement, the creation and rise of online learning, the expansion of degrees and careers to women and underrepresented minorities, and the transformation of *in loco parentis*, among others.

Consider how the first two decades of the twenty-first century brought still more innovations to higher ed: blended learning, a federally led campaign against sexual assault and harassment, a major expansion and contraction of for-profit institutions, the first appearance of AI-backed tutors and campus guides, 3D printing across the curriculum, both augmented and virtual reality for learning, and microcredentials. We should therefore be open to many academic possibilities.

We can imagine a campus where half of the faculty—both researching and teaching—are software. Another institution may exist wholly in two modes unfamiliar to previous generations: mostly online instruction with a distributed, worldwide team of part-time staff to help organize face-to-face events. One state system may collapse into a single campus, dwarfed by its online student body. Students may take classes from three institutions simultaneously, appearing in person only through telepresence robots, building up their academic record through a blockchain-backed evidentiary database, narrated on demand by AI. Student movements may cross campus and national boundaries, forming new social and political constellations. New fields and careers could emerge: AI ethics, digital storyteller management, climate change mitigation administration, gerontology automation. Students who create compelling mixed-reality games may become superstars. Faculty could become cyborgs on multiple levels.

At this point we must reluctantly step away from 2050 and return to the present. How to integrate these wild imaginings and forecasts into the work of today's institutions is the subject of our next and final chapter.