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14. ABSTRACT

Due to a series of scandals in recent years, many western observers have expressed a negative view of technology ethics in China, especially in the biotechnology sector. An examination of the status of technology and ethics in China highlights two significant trends: the stunning rise of China as a technology powerhouse and the deep concerns both inside and outside China over how ethics are not guiding technology development in China. This study demonstrates that the ethics and technology milieu in China is rapidly evolving with areas of grave concern existing alongside areas of great progress. Western governmental, technology, and ethics leaders need a working understanding of the current state of technology ethics in China to responsibly guide policies and partnerships. This study provides this working understanding through a cross-cultural examination of the topic with a focus on China's biotechnology sector.

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Ethics of Technology in The People's Republic of China

With a Focus on Biotechnology

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A paper submitted to the Faculty of the United States Naval War College, Newport, RI in partial satisfaction of the requirements of the Ethics and Emerging Military Technology graduate certificate.

Abstract

Due to a series of scandals in recent years, many western observers have expressed a negative view of technology ethics in China, especially in the biotechnology sector. An examination of the status of technology and ethics in China highlights two significant trends: the stunning rise of China as a technology powerhouse and the deep concerns both inside and outside China over how ethics are not guiding technology development in China. This study demonstrates that the ethics and technology milieu in China is rapidly evolving with areas of grave concern existing alongside areas of great progress. Western governmental, technology, and ethics leaders need a working understanding of the current state of technology ethics in China to responsibly guide policies and partnerships. This study provides this working understanding through a cross-cultural examination of the topic with a focus on China's biotechnology sector.

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Table of Contents

Introduction

On the 26th of November 2018 an event occurred in China that sent ethical shockwaves through the scientific world. He Jiankui, a scientist in China, announced via YouTube that he had used CRISPR-Cas9, a gene-editing tool, to genetically alter embryos to make them resistant, or possibly immune, to human immunodeficiency virus (HIV). Two babies, named Lulu and Nana, were born out of this experiment.[1] The negative reaction was strong and immediate. Scientists and bioethicists in China and around the world issued condemnations for what was widely perceived as a fundamental breach of medical and scientific ethical norms. On the day of He's announcement over one hundred scientists in China signed a statement "condemning He for violating scientific, ethical, and legal norms."[2] Within days hundreds of Chinese scientists had added their signature to the statement to express their revulsion at He's activities.[3] However, this incident reinforced negative views outside of China with some charging that in the biomedical sector China was an ethical "lawless frontier in which anything and everything is possible."[4]

The He Jiankui incident brought attention to two significant technology-related trends with respect to China and its relationship to the wider international community. The first is a stunning and rapid rise in technology development in China. The second is deep ethical concerns both inside and outside China about how ethics are, or are not, influencing the development and use of

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[1] Ruiping Lei, Xiaomei Zhai, Wei Zhu, Renzong Qiu, "Reboot Ethics Governance in China," *Nature 569* (May 2019): 184-5.
[2] Xiaomei Zhai, Ruiping Lei, and Renzhong Qiu, "Lessons from the He Jiankui Incident," *Issues in Science and Technology* 35, no.4 (2019): 20.
[3] Ibid, 20.
[4] Lijing Jiang and Hallam Stevens, "Chinese Biotech Versus International Ethics? Accounting for the China-America CRISPR Ethical Divide," *BioSocieties* 10, no. 4 (2015): 483-4.

emerging technologies, especially in sensitive areas such as biotechnology. The nexus of these trends has created a dilemma for ethicists both in and out of China and is a key component in debates over bioethics in China.

The People's Republic of China is widely viewed as an emerging technology powerhouse.[5] China's achievements in the technology arena have arisen in stunning fashion over a relatively short number of years. According to an analysis conducted in 2021 by FTSE Russell, China's technology sector has evolved rapidly in the last ten years due in large part to focused government investment. The PRC government's 14th Five Year Plan, which covers the years 2021-2025, calls for annual growth in government spending on technology research and development by seven percent. The number of large and mid-cap technology companies in China has quintupled since 2015.[6] China appears to be on the cutting edge of technology development in several emerging fields, including quantum information, photonics, nano electronics, artificial intelligence (AI), biotech, and modern energy systems among many others.[7]

The government of China has demonstrated a sustained commitment to development across a wide swath of technology activities with a goal of placing China in the first rank of technology powers.[8] This is particularly evident in the field of biotechnology. China has spent lavishly on biotech facilities, which include one of the largest genome sequencing centers in the world. There

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[5] Ayo Wahlberg, "China as an 'Emerging Biotech Power,'" *Third World Quarterly* 33, no.4 (2012): 624.
[6] Emerald Yau, "The Rise of China Tech," *FTSE Russell*, October 22, 2021, https://www.ftserussell.com/blogs/rise-china-tech.
[7] People's Republic of China National People's Congress, "Outline of the People's Republic of China 14th Five-Year Plan for National Economic and Social Development and Long-Range Objectives for 2035," *Beijing, Xinhua News Agency*, March 12, 2021, English translation by Etcetera Language Group (May 12, 2021).
[8] Ibid, 7.

has also been a marked increase in the number of published biotech articles by Chinese scientists in journals as well as a significant increase in collaborative efforts with international partners.[9]

However, the rapid advance of China's biotech development has resulted in numerous scandals concerning the ethical implications of technology development. One example is the so-called 'Golden Rice Controversy' that occurred in 2012 in which a genetically modified strain of rice was fed to children during a clinical trial. None of the children or their parents were informed of the nature of the rice or potential risks involved. The trial did not go through an ethical review as one of the leaders of the clinical trial fabricated approval documents. When questioned about the ethical transgression, the leaders of the study stated that their reason for behaving as they did was a desire to save time and push the trial through and that they didn't realize there was anything ethically wrong with their conduct. Highlighting a concern that will be addressed later in this study, this clinical trial was part of a partnership with research institutions in the United States (US).[10] These types of lapses have happened on many occasions and are evidence of a serious problem in biotechnology ethics in China. The field of biotech is particularly sensitive to ethical concerns due to the ability to affect fundamental areas of human existence such as reproduction, health, and cognitive functioning.

These types of scandals have given rise to fears that ethics and moral values are either being ignored or paid lip service to in China. Given the extreme potential for both benefit and abuse from advances in biotech, there are deep concerns both internationally and inside China that bioethics regimes in China are not up to the task of regulating this sensitive industry. Writing in

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[9] Wahlberg, "China as an 'Emerging Biotech Power,'" 627.
[10] Jane Qiu, "China Sacks Officials Over Golden Rice Controversy," *Nature,* December 10, 2012,https://www.nature.com/articles/nature.2012.11998#:~:text=China%20has%20sacked%20three%20officials,by%20the%20environmental%20group%20Greenpeace.

2015 after a previous gene-editing controversy in China, Didi Tatlow, a Germany-based expert on China technology issues, noted that there was a "worry that medical researchers in China are stepping over ethical boundaries long accepted in the West."[11] This has deep implications for the global biotech industry as research and development in this field crosses national boundaries, which requires global cooperation and communication to guide ethical governance internationally.[12] China's approach to bioethics has the power to influence international institutions, regulatory frameworks, as well as less formal means of ethical interactions such as norms and day-to-day interactions. Thus, ethical lapses in China cause a ripple effect across the entire global biotech industry.

The potential for conflict and disruption over this increasingly important industry due to ethical lapses looms as a dark threat. Bioethical lapses can impact the health, economic welfare, and lives of hundreds of millions of people around the world. This highlights an important problem for both researchers and practitioners of technology ethics: the deficit in cross-cultural understanding of technology ethics. Cross-cultural understanding of technology ethics will become increasingly important in the 21st century. This is relevant in the case of China as it has risen to occupy a powerful and influential position in the realm of emerging technologies, particularly in the biotech field, while also being heir to a millennia-old ethical system of its own.

The purpose of this study is to provide political, technology, and ethics leaders in the US and other concerned nations a basic cross-cultural study of technology ethics in China. A balanced treatment of the current state of technology ethics in China can inform technology and political

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[11] Didi Kirsten Tatlow, "A Scientific Ethical Divide Between China and West," *New York Times*, June 29, 2015, https://www.nytimes.com/2015/06/30/science/a-scientific-ethical-divide-between-china-and-west.html

[12] Lijing, "Chinese Biotech Versus International Ethics?", 486.

leaders and provide recommendations for responsibly and ethically participating in technology partnerships and projects with entities in China. This study focuses on bioethics; however, the ethical issues and concerns raised here apply over the whole range of emerging technologies and thus provide valuable information to approach ethical issues in a variety of technology fields. Bioethics is a valuable lens to examine the current state of technology ethics in China because China's clearest progress in applying ethics to technology have occurred in this sector. Biotechnology is also the sector that has witnessed some of China's most dramatic ethical scandals and the subsequent efforts among ethicists and scientists to address shortcomings revealed by these scandals.

In order to accomplish this, it is important to first understand the cultural and historical underpinnings of China's modern ethical climate. There is an almost limitless amount of information one could draw upon to explore the factors that influence technology ethics in China; however, this study explores the most important influences. After examining the underpinnings, a brief sketch of the current state of ethics, especially bioethics, in modern China is presented. Finally, this study provides recommendations to assist concerned leaders in crafting policies that influence US-China technology interactions while also providing a means to continue the ethical dialogue that is necessary to safely guide technology development.

The Underpinnings of Ethics in China

China is in a state of ethical flux as a new era of moral development and progress emerges from an old era characterized by chaos, trauma, and moral uncertainty. However, to understand the current state of technology ethics in China, it is vital to first understand the underpinnings of ethics of technology in that ancient civilization. Numerous factors have influenced the evolution of ethics in modern China. The most important can be grouped into two broad categories: historical underpinnings and philosophical underpinnings. These two groupings are deeply and inextricably intertwined but will be disentangled in this study. It will become apparent to the reader, though, how close historical and philosophical factors are to each other and how much they interact with each other in the evolution of ethics of technology in China.

The historical underpinnings of ethics of technology in China are vast and varied as would be expected for a civilization with thousands of years of continuous history. However, there are several key periods and events in China's relatively recent history that have an outsized effect on contemporary ethics in China. These are the Century of Humiliation (1840-1949), the assumption of rule by the Communist Party of China (CPC) and the Maoist era (1949-1976), and the post-Mao period (1976-present). Each of these periods witnessed several events that had a profound impact on the evolution of ethics. In studying these historical periods, it is clear that trauma has played an outsized role in the development of many aspects of modern Chinese society. Trauma is a key theme that guides understanding of how these historical periods and the events embedded within them influenced Chinese society. Understanding the trauma suffered by China, particularly since 1840, provides vital insight into how ethics of technology has developed in modern China. This is true of the depredations committed by colonial powers, especially Britain and Japan. It is also true

of the Mao era during which the CPC inflicted tremendous trauma on the Chinese people and society. These periods in the history of modern China are crucial for understanding the current state of ethics of technology in China.

History alone is a necessary but insufficient tutor to understand the ethics of technology in China. The philosophical underpinnings of technology ethics in China must also be considered. The richness of philosophical thought in China rivals that of any other great civilization. For millennia, philosophers in China have wrestled with great ethical questions and have sought to apply ethical values to technology. As with history, there is a wealth of information to draw from, but it is important to limit the scope of philosophical traditions to consider those that most directly influence ethics of technology. The philosophical underpinnings of ethics in China that will be considered in this study are Confucianism, the governing philosophy of the CPC, and Western philosophical and ethical traditions.

Historical Underpinnings

The weight of history sits heavily atop contemporary China, particularly as it relates to ethics and technology. Many of China's relatively recent historical experiences have inflicted tremendous trauma on the Chinese people and nation. This trauma has had a profound effect on how ethics are applied to everyday life, including development and use of emerging technologies. The intent in examining historical underpinnings of technology ethics in this study is not to provide an exhaustive treatment of the periods and events, but rather to provide a brief overview and

examine how history directly influenced the development of China's unique ethical perspective as it relates to technology.[13]

The Century of Humiliation (1840-1949)

The first great trauma suffered by modern China came at the hands of a colonial power. Great Britain's victory over China in the First Opium War (1840-1842) inaugurated an era known in China as the Century of Humiliation.[14] In many ways this violent and traumatic conflict set the stage for many of the traumas that followed. These traumas in turn had a profound effect on how China developed its unique approach to ethics and technology. After defeating Qing Dynasty China in the First Opium War, Britain forced the first of what came to be known as unequal treaties on China.[15] These treaties extracted enormous concessions from China while providing little of substance in return. Over the course of the century from 1840, Britain was joined by other European powers in carving concessions from China. Russia, France, and Germany all took advantage of the weakness of the Qing Dynasty to seize territory and dignity from China.[16] In 1895 Japan entered the fray and began a half-century of violent exploitation of China.[17] The Treaty of Versailles in 1919 inflicted yet another blow to China that highlighted its technological weakness vis-a-vis Western powers as the wishes of China at the peace conference were ignored.[18]

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[13] There is a wealth of literature on each of these historical underpinnings that the reader is encouraged to seek out for a deeper understanding of the history of modern China, but such depth will not be provided in this study.
[14] Jonathan Fenby, *Modern China: The Fall and Rise of a Great Power, 1850 to the Present* (New York, HarperCollins Publishers, 2008, 9-10.
[15] Odd Arne Westad, *Restless Empire: China and the World Since 1750 (*London, Vintage, 2012), 43-4.
[16] Ibid, 60-2.
[17] Ibid, 103-4.
[18] Fenby, *Modern China,* 141-2.

It is difficult for a foreigner to grasp the extent of the trauma suffered by the people of China during that terrible century. Trauma has colored how modern China sees the world and how China conducts itself within the international arena in complex ways. It is, however, more straightforward to understand how the trauma of the Century of Humiliation influenced the evolution of technology ethics in China. The advent of this century of trauma was viewed inside China as culturally superior China being defeated by culturally inferior foreign actors due almost exclusively to the technological superiority of those foreign actors.[19]

In the aftermath of the First Opium War a debate took place in China about what had transpired. The upshot of that debate was the formulation of a principle known as *ti-yong.* Simply put, culture and technology were put into two separate categories: *ti* is what is important (China's superior culture) and *yong* is what is useful (western technology and knowledge). The useful foreign influences were viewed as culturally inferior and kept separate from that which is important: Chinese culture.[20] This culture-technology dichotomy had the effect of separating ethics from technology, at least what was viewed as non-Chinese technology. For the Qing Dynasty elite this created an ideology that comforted them during a time of chaotic and painful change.[21] However, this dichotomy created problems for reformers in China that led to additional social chaos and trauma.

Zhang Zhidong, the governor general of Hunan and Hubei provinces, was a key voice of technological reform during the late nineteenth century. Zhang had been a staunch conservative

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[19] Ibid, 43.
[20] Jiwei Ci, *Dialectic of the Chinese Revolution: From Utopianism to Hedonism (*Stanford, Stanford University Press, 1994), 26-7.
[21] Jonathan Spence, *The Search for Modern China (*New York, W.W. Norton & Company, 1990), 225.

who identified more with the *ti* side of the *ti-yong* construct, but he eventually came to be one of the leading practitioners of importing western technology and know-how. He founded the first railway in China and the Han-ye Ping Mines, which were the first coal, iron, and steel industrial complex in China. However, in order to get royal permission to undertake his grand projects he had to sell his ideas to the Qing royal elites using the language of *ti*, which indicates the level of friction caused by importation of new technology from foreigners.[22] The reform trend of using western technology and knowledge to bring progress to China widened throughout the late Qing period (late 19th-early 20th century), but Qing elite conservatism deeply frustrated the reformers leading to rebellions against the Qing rulers.[23] This social and ideological bifurcation was one, but not the only, reason for the eventual collapse of the Qing Dynasty in the early 20th century. This bifurcation of ethics and technology had the effect of stymying technology development in Qing Dynasty China which kept China weak and led to additional traumas throughout the Century of Humiliation. This was the view promulgated by the CPC during the Mao era. They believed that the importation of western technology and culture during the 19th century was a key factor that led to continued humiliation and consigned China to a subservient status.[24]

The Era of Mao Zedong (1949-1976)

The depredations and humiliations suffered by China in the nineteenth and early twentieth centuries led directly to a reckoning with history. That reckoning arrived fully in 1949 in the form of the Communist Party of China and the person of its Chairman Mao Zedong. However, rather than addressing and alleviating the plight of the people of China, the CPC under the leadership of

[22] Ibid, 225.
[23] Ibid, 226-8.
[24] Ibid, 643.

Mao inflicted even greater traumas on China. Most, if not all, of these traumas flowed directly or indirectly from the catch-up-to-the-West ethic that flowed from the experience of the Century of Humiliation.

The greatest trauma of the Mao era is arguably the Great Leap Forward. In a four-year period (1958-1962) tens of millions of Chinese people perished due to the policies of Mao Zedong and the CPC.[25] The Great Leap Forward was the practical application of the catch-up technology ethic. Mao and the CPC set a goal that China would leap ahead of Britain in production in a wildly unrealistic fifteen-year timeframe, particularly in the areas of "iron, steel, and other industrial products."[26] Coercive policies that were implemented and enforced to meet this goal caused widespread chaos, famine, and death. Due to the Communist Party's culpability in inflicting this trauma on China, records of the death toll are difficult for outsiders (not to mention Chinese citizens) to access and thus the real death toll has never been fully determined, though it could have been as high as forty-five million people.[27]

The technology-driven trauma of the Great Leap Forward undermined the leadership of Mao and the CPC and led directly to the next important trauma of the Mao era, the Great Proletarian Cultural Revolution, known commonly as the Cultural Revolution. In basic terms, the Cultural Revolution was an attempt by Mao, in the aftermath of the technological and governance failure of the Great Leap Forward, to reassert control over the CPC and the country.[28] This effort took the form of a full-frontal assault on the ethical and cultural norms of China which were

[25] Yang Jisheng, *Tombstone: The Great Chinese Famine 1958-1962 (*New York, Farrar, Straus, and Giroux, 2008), 12-3.
[26] Frank Dikkoter, *Mao's Great Famine (*New York, Walker Publishing, 2010), 15.
[27] Ibid, xii.
[28] Ibid, xiv.

characterized as the four olds: "old ideas, old culture, old customs, and old habits of the exploiting classes."[29] From 1966 until Mao's death in 1976 the chaos of the Cultural Revolution raged across China. Old ways, especially old cultural norms and belief systems such as Confucianism, were viciously attacked.[30] The effect of this decade of chaos, piled on top of over a century of trauma, was the moral and ethical exhaustion of the Chinese people.[31] This exhaustion had tremendous implications for the ethics of technology that evolved in the post-Mao period.

The Post-Mao Period (1976-Present)

With the death of Mao Zedong in 1976, China experienced a moral and cultural earthquake that had a profound and lasting impact on how ethics and technology interact in modern China.[32] The post-Mao period in China as it relates to ethics can be divided into two periods. The first period commenced almost immediately upon the passing of Mao and lasted until the end of the formal leadership of Deng Xiaoping over the CPC and China (1976-1989). During this first period Deng took control of China and radically altered its economic and social trajectory. The second period began to take shape after Jiang Zemin rose to power in 1989 and recognized a problem with ethics and morality in post-Mao China. The zeitgeist of the first period was ethical chaos. The hallmark of the second period, which continues to this day, is a desire to fill China's ethical and moral vacuum with a China-centric set of ethics and morals.

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[29] Roderick Macfarquhar, *Mao's Last Revolution (*Cambridge, Harvard University Press, 2006), 108.
[30] He Huaihong. *Social Ethics in a Changing China* (Washington, D.C., Brookings Institution Press, 2015), 86, 119-120.
[31] Jiwei Ci, *Dialectic*, 11.
[32] Huaihong, *Social Ethics*, xviii, 111.

Upon the death of Mao Zedong, Maoism as a socialist quasi-religion collapsed and the Maoist moral order, which defined virtue as total obedience to Mao,[33] died along with it.[34] In his insightful monograph "Dialectic of the Chinese Revolution," Jiwei Ci described the Chinese people as "spiritually exhausted" in the immediate post-Mao moment.[35] The moral and ethical psyche of China imploded, creating a spiritual crisis in China.[36] The Chinese people should have undergone a thoughtful examination of the trauma that Mao and CPC had inflicted on them. However, to protect its reputation and power the CPC blocked any critical examination of the Maoist period[37] and "drove the people to hedonism."[38] This led to the defining zeitgeist of the immediate post-Mao period in China in which the collective good was dead and each person became their own god with deleterious effects on social ethics and morality.[39]

During the immediate post-Mao period corruption thrived,[40] selfishness became a defining characteristic of social interaction,[41] and professional ethics all but disappeared from technological and economic development.[42] This state of affairs led to rapid economic growth and technological development, but at terrible moral cost. The ethical vacuum became apparent to many Chinese, and a general desire to reform this aspect of Chinese society slowly began to emerge; but as with many aspects of modern China any substantive change would require the agency of the CPC.

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[33] Jiwei, *Dialectic, 113.*
[34] Ibid, 102.
[35] Ibid, 11.
[36] Ibid, 19.
[37] Huaihong, *Social Ethics*, xxiv.
[38] Jiwei, *Dialectic*, 9.
[39] Ibid, 197.
[40] Ibid, 8.
[41] Ibid, 102.
[42] Huaihong, *Social Ethics*, xxiii.

In 2002 Jiang Zemin took the first steps toward official recognition of China's ethical problem with a visit to the China Academy of Social Sciences (CASS) to highlight the value of philosophy, especially Confucianism.[43] Jiang's successor as General Secretary of the CPC, Hu Jintao (2002-2012), further iterated on this process of ethical regeneration by outlining his eight honors and eight disgraces, which were also called "the socialist core value system." Hu's ethical formulation focused on social morality, patriotism, hard work, and civic duty. Hu unveiled these principles in 2011 at the 16th Chinese Communist Party Central Committee Meeting which gives an indication of how important addressing social morality was to the Party at that time as only the most important national business is addressed at these highest-level meetings. This was Hu's attempt at creating an ethical construct to guide China out of the Mao and post-Mao moral and ethical chaos.[44]

This process of ethical rejuvenation has been slow and halting largely because the CPC jealously guards its reputation and power. Additionally, authoritarian systems such as that run by the CPC are averse to their people developing a wide-ranging moral sensibility. A full accounting of the traumas and abuses of the Maoist and post-Maoist periods is actively blocked by the CPC. Examination of the past is an inherently political act in the minds of CPC leaders and must therefore be strictly controlled. In terms of ethics, this is where modern China sits today, namely between two worlds. The previous world was marked by trauma and moral chaos and ended with an implosion of social ethics and morality upon the death of Mao. China is moving in fits and starts toward a new social order where ethical and societal norms are better defined and widely followed.

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[43] Shufang Wu,"The Revival of Confucianism and the CCP's Struggle for Cultural Leadership: a Content Analysis of the People's Daily, 2000-2009." *Journal of Contemporary China* 23, no.89 (2014): 972.
[44] Ibid, 5.

Philosophical Underpinnings

The philosophical underpinnings of ethics of technology in China are just as varied and complex as the historical underpinnings. There are many philosophical influences on contemporary China and the Chinese people, including Confucianism, Taoism, and Buddhism among others. However, when considering how ethics and technology interact there are several philosophical influences that stand out as significant. The foundational philosophical underpinning of ethics in China is Confucianism. It is not possible to understand the current ethical milieu in China without reference to this ancient and highly influential Chinese philosophy. Another philosophical underpinning is the ethics and morality of the Communist Party of China. As with Confucianism, one cannot comprehend present-day China without considering the values of the CPC and its direct effect on societal ethics. Western ethics is another powerful philosophical influence on the ethics of China. These three philosophical influences stand out among a host of others as the key underpinnings of the ethics of technology of China in the twenty-first century.

Confucianism

Perhaps the single most important philosophical influence on ethics, including bioethics, in modern China is the approximately 2,500 year-old philosophy of Confucianism.[45] Chinese society is rooted in this belief system.[46] Confucianism isn't a religion per se, but rather a social system that defines societal obligations and relationships; nevertheless, there is an ongoing debate between Confucianism practitioners in China, Hong Kong, and Taiwan over the question of

[45] Fan Ruiping, "Confucian Reflective Equilibrium: Why Principlism is Misleading for Chinese Bioethical Decision-Making," *Asian Bioethics Review* 4, no.1 (2012): 4.
[46] Chengzhou He, "New Confucianism, Science and the Future of the Environment," *European Review* 26, no.2 (2018): 369.

whether or not Confucianism is a religion.[47] Its impact on Chinese society and governance cannot be overstated as it has historically been the main philosophical influence upon social governance in China.[48]

Although the CPC tried to suppress Confucianism at various times during the Mao era,[49] the Party has apparently now decided to foster the reemergence of Confucianism, or at least the aspects of Confucianism that the Party approves of, and use it as a tool of their rule.[50] Current CPC chairman Xi Jinping in particular appears to have become a champion of reestablishing the importance of Confucianism in China.[51] According to Hong Kong-based public policy professor Yi-Huah Jiang, western leaders need to understand Confucianism's role in China if they hope to understand modern China.[52] Knowledge of Confucianism is also crucial to understanding ethics of technology in China because Confucianism is a key factor in the development of China's unique approach to technology ethics.[53] This highlights the need for a cross-cultural understanding of Confucianism in order to study technology ethics in China.

What is Confucianism? This question is critical for leaders to answer to comprehend how ethics of technology operate in China. Given that the philosophy of Confucianism is over two millennia old and has several subcategories (neo-Confucianism and New Confucianism for

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[47] Lei Sun, "The Relation Between Confucianism and Chinese Politics: History, Actuality, and Future," *Journal of Law and Religion* 35, no.1 (2020): 138-9.
[48] Lei, "The Relation," 146.
[49] Yi-Huah Jiang, "Confucian Political Theory in Contemporary China," *Annual Review of Political Science* 21 (2018): 163.
[50] Ibid, 166.
[51] Lei, "The Relation," 146.
[52] Yi-Huah, "Confucian," 171.
[53] Hannah Rose Kirk, Lee, Kangyu, Micallef, Carlisle, "The Nuances of Confucianism in Technology Policy: An Inquiry into the Interaction Between Cultural and Political Systems in Chinese Digital Ethics," *International Journal of Politics, Culture, and Society* (2020), 2.

instance), the complexity of this topic must be simplified for this study.[54] Confucianism is a highly relational virtue ethics system, which means that Confucianism places a premium on virtuous behavior in human relations, primarily those relations that are proximate to the individual. Ethics are only discoverable and definable by interaction of the individual with others, especially family.[55] Therefore, relationships are seen as primary modes of ethical discourse; individuals do not act alone but are integral moral parts of a communal whole.[56] In this it can be intuited that Confucianism is not conducive to concepts like universal values or principles that are firmly set outside social context.[57] Indeed, Chinese bioethicist Fan Ruiping, in a study highlighting the differences between western "principlism" and Confucianism, argued that Confucianism shies "away from any extreme moral positions, either radically liberal or radically conservative."[58] In a sense, Confucianism is a relativistic ethic in that one must account for the life circumstances and relationship obligations of the individual when considering whether a given action is ethical in Confucian thought.

The core of Confucianism are the five relations and the five virtues, which generate the five key aspects of Confucian values. The five relations that prescribe the social obligations of individuals are "emperor-subject, father-son, husband-wife, elder-younger brothers, and friend-friend." The five virtues that serve the development of character and ethical evolution are:

[54] Chengzhou, "New Confucianism," 369.
[55] Fan, "Confucian Reflective Equilibrium," 5-6.
[56] Liang-Hung Lin, Yu-Ling Ho, and Wei-Hsin, Eugenia Lin, "Confucian and Taoist Work Values: An Exploratory Study of the Chinese Transformational Leadership Behavior, " *Journal of Business Ethics 11*3, no.1 (2013): 94.
[57] Fan, "Confucian Reflective Equilibrium," 5.
[58] Ibid, 12.

"benevolence, righteousness, propriety, wisdom, and trustworthiness."[59] The values that these relations and virtues give rise to are: hierarchy and harmony through proper class behavior, group orientation, maintenance of informal relationship obligations (also known as guanxi), the concept of face, and a view of time oriented toward the past.[60] This creates an ethical character that is obedient to authority, noncompetitive, harmonious, and tolerant.[61] Much of Confucian thought is summarized in the concept *tian ren he yi* which expresses the idea that there is unity of man and nature. The highest goal within this concept is peace and stability of society.[62] If fulfilled, this goal honors ancestors while fulfilling obligations towards future generations.[63] Thus individual actions are judged moral or not based on how they impact social stability and interpersonal relations, but not necessarily by how they measure up to a universal moral code.

This peace and stability, or societal harmony, goal of Confucian thought is a key driver of how the individual and small social groupings (family, clan, etc.) interact with authority, governmental and otherwise. Confucianism's focus on hierarchy, unity, and stability serves to legitimize authority and provides a supporting rationale for authoritarian governance.[64] Further, there is no true sense of equality in Confucianism; rather, individuals have their place in their social hierarchical system and should behave appropriately to those above, below, and on a similar social level.[65] This attitude toward authority and equality gives extensive power to government

[59] Quey-Jen Yeh and Xiaojun Xu, "The Effect of Confucian Work Ethics on Learning About Science and Technology Knowledge and Morality," *Journal of Business Ethics* 95, no.1 (2010): 112.
[60] Ibid, 112.
[61] Ibid, 112-3.
[62] Chengzhou, "New Confucianism," 373-5.
[63] Ibid, 375.
[64] Kirk, "The Nuances of Confucianism," 2.
[65] Ibid, 3-4.

and other types of leadership as leaders are deemed crucial to societal maintenance with legitimate power to override the rights of individuals to fulfill their governing responsibility.[66]

In typical Confucian-oriented organizations, be they government or companies, there is a sense that the organization is a family. Leaders are considered equivalent to parents and subordinates as children. Social harmony and conformity to leader expectations are maximized while individuality or individual rights are subordinated to the common good.[67] The overarching value in Confucian-style governance is stability, while the primary evil is chaos.[68] The CPC appears to have come to appreciate this aspect of Confucianism as it assists them in their goal of furthering their rule through subordination of the Chinese people to the CPC's concept of stability. There is an irony in this as the governing philosophy from their founding until the death of Mao was based on constant revolutionary activity, or more simply, chaos. The CPC's use or manipulation of Confucianism to further their own ends has the effect of turning Confucianism from a virtue ethic to a utilitarian ethic in which ends justify means.

How does Confucianism affect ethics of technology in modern China? As the influence of Confucianism in Chinese society continues to grow there are several aspects of the ideology that impact how ethics are applied to technology, many of which are very positive from a western ethical perspective. Chinese academic and scientist Chengzhou He argued that Confucianism can overcome ethical blind spots in science and that it can serve as a vehicle for injecting the humanities back into the scientific discussion.[69] The upshot of this could be a more thorough ethical discussion of societal impacts of emerging technology. Chengzhou further argued that this

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[66] Ibid, 3-4.
[67] Liang-Hung, "Confucian and Taoist Work Values," 95.
[68] Kirk, "The Nuances of Confucianism," 10.
[69] Chengzhou, "New Confucianism," 371-372

can provide a "spiritual side" to science and technology. This is reflected in the idea that the *tian ren he yi* concept of man and nature as a unity could empower environmental protection efforts in China and make China a leader on global environmental issues.[70]

Additionally, the collectivist nature of Confucian ethics seems almost purpose built for ethical discussion of the impact of technologies on society. This is a very important area of technology ethics that can at times be a weak point in western ethical practice. As Hong Kong academician Yi-Huah Jiang pointed out, Confucianism can also benefit society through its focus on benevolent government.[71] This perspective can counteract the tilt toward submission to authoritarianism many scholars have noticed in Confucianism by requiring authorities to act benevolently rather than protecting their power. Confucianism also strongly encourages education and personal improvement.[72] All of these factors have the potential to make Confucianism's influence on technology ethics in China positive by constructively encouraging greater sensitivity to the connection between technology and ethics. As the trend toward a greater appreciation for the role of ethics progresses, including those derived from Chinese cultural influences, China can become a leading voice on the international stage in discussions of technology ethics.

However, there are negative aspects in the way Confucianism can interact with technology ethics in China. Perhaps the most obvious problem with Confucianism, at least from a western liberal position, is the strong bent toward authoritarianism in governance. Because Confucianism often lends itself to authoritarianism, it encourages a form of governance in which the government can freely intervene in both public and private life.[73] This is apparently one of the main reasons

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[70] Ibid, 373.
[71] Yi-Huah, "Confucian," 157.
[72] Kirk, "The Nuances of Confucianism," 3-4.
[73] Ibid, 7.

the CPC has chosen to incorporate Confucianism back into social life in China. The CPC uses technology alongside Confucian justifications to strengthen and extend its rule.[74] A prime example of this is the technology-driven mass surveillance system in Xinjiang. Human Rights Watch (HRW) noted that security officials in China use a variety of technology applications to gather a wide array of personal information on every Muslim in Xinjiang. Closed circuit cameras with facial recognition technology, Wi-Fi sniffers, sensors at checkpoints, and DNA sequencers (developed with assistance by academics and companies in the US) are all used to provide total tracking and control of millions of individuals. According to HRW, the result of this technology-enabled mass surveillance system is "Chinese authorities, bolstered by technology, arbitrarily and indefinitely detaining Turkic Muslims in Xinjiang en masse for actions and behaviors that are not crimes under Chinese law."[75] The ethically problematic result is the use of technology by the CPC to maximize government/party agency while minimizing the agency and rights of Chinese citizens. This situation is rooted in the Confucian ethical stance that there are no universal human rights, rather rights must be considered in context and always determined by the authority.[76] In fact, Confucianism appears quite hostile to the concept of universal human rights.[77] This opens the door to abusive use of technology due to the utilitarian usage by the CPC of an erstwhile virtue ethic.

On the level of the individual, the effect of Confucian ethics in the area of technology is also highly problematic. The Confucian concept that individuals inhabit a place in the social hierarchy and should not speak above their station can have a deleterious effect on ethical conduct

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[74] Ibid, 8.
[75] Maya Wang, "China's Algorithms of Repression: Reverse Engineering a Xinjiang Police Mass Surveillance App," Human Rights Watch, August 7, 2019. https://www.hrw.org/report/2019/05/01/chinas-algorithms-repression/reverse-engineering-xinjiang-police-mass-surveillance.
[76] Yi-Huah, "Confucian," 166.
[77] Fan, "Confucian Reflective Equilibrium," 5-7.

from a western perspective. Group think, abuse by leaders, and punishment of whistleblowers are all features of this ethical approach to technology.[78] This inevitably creates an atmosphere in which ethically problematic applications of technology are not challenged by workers, citizens, or others outside the limited circle of authority created by the Communist Party and in some cases company leaders and managers.

A further problem arises concerning agreements. In Confucian thought, contracts, agreements, treaties, and other formalized types of interactions are not as important as relationships.[79] This generates a serious problem for foreign governments and companies conducting business or other types of negotiations in China as the idea that contracts and formal agreements are sacrosanct under a rule of law system is not necessarily a value in Confucian thought. This problem is especially acute in the biotechnology sector as highly sensitive and potentially dangerous technologies need strict governance. Given the cross-border nature of biotech research and development, it is imperative that international partners have confidence in the agreements and contracts brokered with their counterparts in China. Additionally, other governments must have confidence that China will live up to the terms of international conventions governing the development of biotechnology, especially bioweapons. This relational aspect of Confucianism can undermine a formalized approach to agreements, conventions, and contracts.

An example of this dynamic has occurred around forced organ harvesting from prisoners in China. Prior to 2005, medical ethicists and human rights observers had long suspected that China was unethically harvesting organs from executed prisoners. Data was hard to obtain on this topic because a 1984 law that made harvesting prisoner organs legal also made the practice a state

[78] Quey-Jen, "The Effect of Confucian Work Ethics," 113-115.
[79] Liang-Hung, "Confucian and Taoist Work Values," 96.

secret.[80] In 2005 China admitted to the practice of harvesting organs from executed prisoners, although details such as numbers and consent procedures were still confidential. Beginning in 2007, China pledged to the World Medical Association (WMA) that it would soon end the practice.[81] In 2013, 38 hospitals in China signed the *Hangzhou Resolution* in which they pledged to immediately end the practice of organ harvesting from prisoners.[82] Foreign ethicists and human rights campaigners charge that this unethical practice is still taking place and, in fact, seems to have actually increased since China made its pledges to stop it.[83] Despite the agreements, pledges, and promises, China is still conducting a grossly unethical, according to foreign observers, biomedical practice while asserting that they are doing nothing wrong.[84] Crucially, the practice of prisoner organ harvesting seems to happen in an ad-hoc, relationship-based system rather than as part of a process governed by rules and regulations.[85]

Some Chinese ethicists have expressed fears that the growing influence of Confucianism on technology ethics in China could lead to an ethical split with the West.[86] This would be disastrous for global biotechnology ethics due to the significant role China plays in the sector, a role that will become more significant in the future. An ethical bifurcation of the world in biotechnology due in part to the influence of Confucianism could make it more likely that dangerous bioweapons, accidents, and other ethical breaches occur as different nations will be able

[80] Allison C. Kirk, et al, "Historical Development and Current Status of Organ Procurement from Death-Row Prisoners in China," *BMC Medical Ethics* 16, no.85 (2015): 2.
[81] Rogers, Wendy Rogers, et al., "Smoke and Mirrors: Unanswered Questions and Misleading Statements Obscure the Truth About Organ Sources in China," *Journal of Medical Ethics 42, no.8* (August 2016), DOI:10.1136/medethics-2016-103533.
[82] Kirk, "Historical Development and Current Status of Organ Procurement," 3.
[83] Rogers, "Smoke and Mirrors".
[84] Allison, "Historical Development and Current Status of Organ Procurement," 3.
[85] Ibid, 2.
[86] Yi-Huah, "Confucian," 164.

to pick and choose what ethics to follow with little global cooperation or standardization. This must be avoided at all costs. However, due to the centralization of power in modern China under the CPC it is only through the CPC that such a fate could be averted. Thus, it is vital for US and other international leaders to understand the philosophy of the CPC and how it affects technology ethics in China.

The Governing Philosophy of the Communist Party of China

Just as Confucian thought provides a philosophical underpinning to the state of ethics in modern China, the ethical values of the CPC also inform and affect China's approach to ethics. This is because the CPC is the single most powerful force in China with an ideology that strongly asserts the centrality of the Party in all aspects of social, political, and moral life. Additionally, CPC leaders are increasingly concerned about the state of ethics in China, and thus they have been casting about for ways to bolster this aspect of Chinese society, but in a manner that doesn't undermine their rule.[87] It is reasonable to expect that the CPC will reach first within their own ideological worldview for solutions to the problem of ethics in modern China. For the CPC, Marxism-Leninism remains "the unshakeable root of the CCP government."[88] It is imperative that leaders in the US have a working knowledge of what this ideology is and what impact it has on ethics in China.

The mention of Marxism-Leninism in the US is usually met with hostility, distrust, and ignorance. However, in the context of modern China there are both positive and negative aspects of how this ideology influences technology ethics. One way to simplify this study is to separate

[87] Huaihong, *Social Ethics,* xx.
[88] Shufang, "The Revival of Confucianism," 982.

Marxism and Leninism as they provide differing values that determine how the CPC guides ethics in China. It must be understood that in simplifying these complex topics some granularity will be lost, but valuable insights into technology ethics in China will be gained. In simplistic terms, Marxism in the context of China can be viewed as influencing the CPC toward an ethic that is of benefit to the Chinese people collectively, while Leninism can be viewed as pushing the CPC toward an ethic of Party power at any cost.

Marxism has provided the CPC with one of their key guiding ethics: "serving the people wholeheartedly."[89] This ethic infuses every area of party direction to subordinate areas of society. In the medical profession we find ethics imposed in a top down manner by the CPC with the primary ethical dictum to "serve the people wholeheartedly and unselfishly."[90] As the CPC dominates almost every aspect of the biomedical profession, this ethic has tremendous power over the ethical views and practices in the biotech industry in China.[91] This manifests itself in the idea that biotech advances should consider the impacts on society, a view which flows from the CPC definition of morality as that which benefits "the State, society, and collectivity."[92]

The Marxist influence on the CPC's values is also reflected in Deng Xiaoping's famous bent toward pragmatism and away from strict communist ideology.[93] Pragmatism has, since Deng, become a defining feature of ethics in China, with both positive and negative consequences. On the positive side of the ledger, Deng's Marxist-inspired pragmatism led to a willingness to try new

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[89] Jingqing Yang, "Serve the People: Understanding Ideology and Professional Ethics of Medicine in China," *Health Care Anal* 18 (2010): 294.
[90] Ibid, 297.
[91] Ibid, 300.
[92] Shufang, "The Revival of Confucianism," 983.
[93] Kang Xiaoguang, "Confucianization: A Future in the Tradition." *Social Research* 73, no.1 (2006): 78.

ethical ideas and approaches, including importing so-called western ethical values. On the negative side, pragmatism can lead to pushing forward with technological progress with little concern for ethical implications, leading to a highly utilitarian ethical milieu in which ends justify means.

Leninism has a far more problematic influence on the ethics of the CPC. This is because Leninism is about the power of the Party over all other aspects of society. In the Chinese context, this is expressed as the CPC's leadership of China being "the foundation and lifeblood of the … country."[94] In fact, Article 1 of the state constitution of China explicitly states that, "Leadership by the Communist Party of China is the defining feature of socialism with Chinese characteristics."[95] Under the power ethic of a Leninist party in China there is no separation of powers[96] as "every institution in China is answerable to the Party."[97] Thus the CPC and its ethic of power of the party at all costs has a potent influence on ethics in China that overrides all other influences.

The Leninist power ethic of the CPC manifests itself in China in several ways that have a direct influence on technology ethics. One of these is a fetish for political stability and maintenance of a status quo under CPC preeminence. This pushes morals and ethics into the realm of the political, as it is by moral and ethical arguments that the rule of the CPC could be most directly challenged.[98] This in turn has led the CPC to replace ethics with teleology (purpose), which has the effect of negating any concept of virtue ethics and moving Chinese society toward a utilitarian

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[94] Susan Lawrence, and MariLee, "China's Political System in Charts: A Snapshot Before the 20th Party Congress." *Congressional Research Service* (Nov 2021): 2. https://crsreports.congress.gov/product/pdf/R/R46977.
[95] Lawrence, "China's Political System," 5.
[96] Ibid, 1.
[97] Rowan Callick, *The Party Forever: Inside China's Modern Communist Elite* (New York, Palgrave Macmillan, 2013), 11.
[98] Jiwei Ci, *Dialectic*, 11.

ethic of ends justifying means (the ends in this case being continued rule of the Party).[99] Put another way, the teleology of Chinese society and citizens is to uphold the rule of the party, not necessarily to be moral for the sake of morality. Thus, the highest morality, according to the CPC, is citizens doing their duty to protect the rule of the CPC. It logically follows from this ethical outlook that technology in China should first and foremost serve the interests of the Party and that ethics in China should be bent to serve the Party.

Another warping influence on ethics in China from the values of the CPC is manifested in a fear and loathing of so-called western values. The CPC fears an invasion of western values that could undermine their rule and destabilize Chinese society, which is what the CPC believed happened to 19th century China. Instead of importing tainted western values, the CPC wants to champion their preferred version of Chinese civilization that adheres to the values and dictates of the CPC.[100] This has a direct and harmful effect on technology ethics in China, especially in the biotechnology sphere, because many of the ethical standards that guide the biotechnology sector globally were developed in the West. As will be shown later in this study, western ethics are very influential in China, but this is largely in spite of CPC resistance to values and ethics that the Party considers foreign and thus not necessarily applicable to China.

It must be stressed that the CPC dislike of foreign ethics does not seem to be because the Party has found specific defects in these ethics per se, but because the CPC fears that an influx of values they did not create could undermine their power. This reactionary type of thinking is in line with the CPC's core belief that "the security of absolute leadership" of the party is the paramount

[99] Ibid, 13.
[100] Shufang, "The Revival of Confucianism," 973.

concern.[101] This ethic of power leads the CPC to cynically use Confucianism and other Chinese ethical systems to bolster their power.[102] In short, how the CPC approaches ethics has little to do with ethics and morals but is rather another political approach to maintaining authoritarian power. Anyone studying technology ethics or dealing with entities inside China on ethical issues must be aware of this dynamic that twists any ethical construct into utilitarianism, a utilitarianism that is primarily designed to serve power rather than moral standards.

Western Ethics

Despite the efforts of some in the CPC to demonize foreign cultural influences, western ethical systems are very influential in modern China. This is perhaps most evident in the realm of bioethics. The discipline of bioethics "is a relatively new discipline" in China according to noted China bioethicist Renzong Qiu.[103] Bioethicists and bioethics systems in China rely heavily on western bioethics concepts. However, it is in this area that one can also see tension between the influence of western-evolved ethical systems and some in China who want or envision an ethical divide between China and the West. This type of divide, in their mind, can create space for Chinese cultural influences to flourish unburdened by western ethical concepts.[104] It is vitally important for US and other leaders to understand the tension inherent in the dualistic nature of current Chinese ethical thought to effectively engage with China on ethical issues.

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[101] Ibid, 972.
[102] Kang, "Confucianization," 84.
[103] Renzong Qiu, email message to author, October 21, 2021.
[104] Guillermo Palchik, Celeste Chen, and James Giordano, "Monkey Business? Development, Influence, and Ethics of Potentially Dual-Use Brain Science on the World Stage," *Neuroethics* 11 (2018): 112.

There is a great deal of evidence that western ethical systems and values have a strong influence in China, particularly in the biotechnology arena. PRC bioethicist Renzong Qiu argues that there is a respect for western ethical systems in China, including in the biotechnology sector.[105] A number of Chinese ethicists have argued that, contrary to the perceptions of some western ethicists, there is no ethical divide between the PRC and the West, at least in specific fields such as biotechnology.[106] There is also hard evidence that supports the views of these ethicists; this evidence demonstrates that ethics of technology, including so-called western ethics, are taken very seriously in China.

The evidence that bioethicists in China are strongly influenced by western ethical models is amply demonstrated in the regulations and ethical procedures that have been developed in China. These developments are relatively new, mostly coming into force after the Mao period. For instance, in 2016 the PRC National Health and Family Planning Commission (NHFPC) issued regulations to direct ethical reviews of any biomedical research involving human subjects. It has been argued that these and other bioethics measures in China are modeled on the *Declaration of Helsinki,* which is one of the key foundational bioethics documents.[107]

Indeed, bioethicists in China argue that there is no ethical or regulatory dividing line between China and the West and that ethicists in the West who claim this is the case are wrong.[108] Bioethicists point to a host of regulations and measures in China that mirror or are strongly

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[105] Renzong Qiu, email message to author, October 21, 2021.
[106] Li Jiang and Achim Rosemann, "Human Embryo Gene Editing in China: The Uncertain Legal Status of the Embryo," *Biosocieties* 14 (2019): 47.
[107] Deena Agamy, "Off With Their Heads! How China's Controversial Human Head-Transplant Procedure Exceeds the Parameters of International Ethical Standards in Human Experimentation," *Georgia Journal of International and Comparative Law* 47, no.2 (2019): 506-7.
[108] Li Jiang, "Human Embryo Gene Editing in China," 47.

influenced by western ethics. These include: NHFPC rules governing artificial reproduction technology, management procedures for human genetic resources (also by NHFPC), NHFPC issued Technical Norms on Human Assisted Reproduction, and clinical practice standards issued by the China Food and Drug Administration (CFDA).[109] There are also a host of western-influenced norms and rules issued by the Ministry of Health and the Ministry of Science and Technology to govern bioethical issues. These include rules on the handling of genetic resources, research involving stem cells, ethical clinical practice, integrity and misconduct during biomedical research and procedures, and rules governing research involving human subjects.[110] A very clear example of the western influence on bioethics in China comes in the form of *The Tianjin Biosecurity Guidelines for Codes of Conduct for Scientists,* promulgated in 2021. This document, which was a collaboration between China and Pakistan, directly states its influences as key western documents and institutions and explicitly proclaims that the intention of the document is to respond to "the aspirations of and the determination of international scientific community to responsibly conduct biological research."[111]

Chinese bioethicists and scientists have also participated in and hosted international fora to discuss and collaborate on bioethical issues.[112] One significant collaborative effort was a project between China and European scientists that occurred from 2006 to 2009 called Bionet. The stated objective of Bionet was to "map out practices of ethical governance of biomedical and biological research in China and Europe."[113] The willingness of ethicists and scientists in China to engage

[109] Ibid, 48.
[110] Wahlberg, "China as an 'Emerging Biotech Power'," 627-8.
[111] *"The Tianjin Biosecurity Guidelines for Codes of Conduct for Scientists,".* Ministry of Foreign Affairs, The People's Republic of China, August 27, 2021. https://www.mfa.gov.cn/ce/cegv//eng/dbdt/t1904253.htm
[112] Wahlberg, "China as an 'Emerging Biotech Power'," 623.
[113] Ibid, 625.

with and be influenced by western ethical standards seems very strong from these examples, which it must be remembered is a recent and evolving situation in China. However, tensions between Chinese and international participants arose during Bionet discussions with some Chinese speakers arguing that China had its own unique ethics that must be respected by the West.[114] These tensions at Bionet highlight that acceptance of western ethics is not universal in China and that there is an ongoing debate in China concerning the applicability of western ethics in the Chinese context.

These tensions came to the fore in the aftermath of the He Jiankui incident mentioned in the introduction to this study. Rather than agreeing that He had trespassed important bioethical norms, some scientists and bioethicists in China argued that China should not participate in international bioethics forums and agreements. One of the reasons proffered by proponents of this view was that "there is an unbridgeable and incompatible divide between international ethical guidelines and Chinese traditional culture."[115] In the area of primate research, Chinese neuroscientist Dr. Mu-Ming Poo argued that China was likely better off "without the ethical prohibitions currently in place in the United States and a number of other western countries." According to Poo, one of the advantages provided by this Sino-centric approach to bioethics could be an ability to recruit international neuroscientists who cannot conduct certain types of research in the West due to western ethical values.[116]

It is clear that in China bioethics circles there is a tension between ethical norms that originate in the West and ethical norms based on Chinese cultural traditions and history. China has on many occasions shown a willingness to adopt international ethical norms even in sensitive

[114] Ibid, 630.
[115] Xiaomei, "Lessons from the He Jiankui Incident," 22.
[116] Palchik, "Monkey Business?," 112.

areas. However, there have also been cases in which Chinese scientists, ethicists, and government officials have exhibited an unwillingness to submit to what they view as foreign interference.[117] Given the full weight of historical and philosophical underpinnings on ethics in China, as well as the evolving nature of China's approach to ethics, it is important to survey the current state of bioethics in China.

[117] Lijing, "Chinese Biotech Versus International Ethics?," 484.

The Current State of Ethics of Technology in The People's Republic of China

The current state of technology ethics in China is a complicated question. There are areas where China has made tremendous strides in applying ethics to technology, while in other tech sectors China is arguably far behind current international ethical trends. Nowhere is this dichotomy more apparent than in the biotechnology sector. In this single sector of technology one can witness truly impressive strides among scientists and ethicists in applying ethical constructs to a rapidly advancing and expanding technology field. It is also in this technology sector that one can see some of the more significant problems with technology ethics in China. Using the biotechnology sector is useful because many of the ethical issues are common among the various fields of technology; therefore, this sector provides a highly effective window into technology ethics more generally in China.

Some scientists and ethicists in the West have expressed the opinion that the PRC is a "lawless frontier of biomedical research" and that crossing ethical redlines is a standard practice among biotechnologists in China.[118] Influential bioethicists in China have also expressed the view that there is a significant problem in technology ethics in China. In an article written in the aftermath of the He Jiankui scandal, a PRC bioethicist made the argument that ethical governance of medical research is a flaw, possibly a fatal flaw, of the technology sector in China. He went on to decry a lack of understanding of the importance of ethics among practitioners and regulators in China's biotechnology sector.[119]

[118] Lijing, "Chinese Biotech Versus International Ethics?," 483-4.
[119] Ruiping, "Reboot Ethics Governance in China," 185.

Others have argued that there is no difference between China and the West regarding ethics of technology and that anyone who believes this is jealous of China's rise as a biotech power.[120] The truth appears to be somewhere in the middle largely because China is in a state of ethical and moral transition.[121] This is an expected outcome of a thirty-year period during which China has experienced the most comprehensive changes in its long history.[122] These tumultuous changes have placed China at an ethical and moral crossroads.[123] The situation in China is that there are very positive developments in applying ethics to technology as well as some glaring problem areas. As reminded by a prominent PRC bioethicist, technology ethics in China is a relatively new and developing field. China's ethicists and scientists are working hard to balance individual versus collective interests, obligations, and rights.[124] This suggests that there is a lot of work ahead for ethicists in China, but that progress has been made and the trend is positive.

There is a clear, positive trend in the development of technology ethics in China. The strength of the trend varies by industry but is perhaps most evident in the biotechnology sector. What is striking is that bioethics in China has only been in existence as a discipline for approximately thirty years.[125] Ethical review systems were initiated in the 1990s with additional progress made in the decade of the 2000s with a variety of ethical regulations and measures

[120] Lijing, "Chinese Biotech Versus International Ethics?," 484.
[121] Huaihong, *Social Ethics*, 123.
[122] Ibid, 111.
[123] Ruiping, "Reboot Ethics Governance in China," 184.
[124] Renzong Qiu, email message to author, October 21, 2021.
[125] Ruiping, "Reboot Ethics Governance in China," 186.

implemented.[126] This advance in bioethics is nested within a larger, ongoing societal trend in China of a move toward moral values, social justice, and ethical standards.[127]

Chinese bioethicist Renzong Qiu has been an important leader in this endeavor since 1987. His efforts have led to advances in ethical instruction, textbook development, and conferences in China to advance the discussion and discipline of bioethics; he is a key advisor on bioethics and continues his important work to this day.[128] According to Renzong, PRC bioethicists have made tremendous progress. He points to the recent success of changes to China's Civil Code in 2020 that enshrined bioethics in PRC law.[129] He notes that this progress means that he and other bioethicists in China are free to work, that their opinions are sought by officials, and their advice is often turned into ethical regulations or influence biomedical practice. For instance, Renzong related an instance in the 1990s in which the provincial legislature of Gansu Province promulgated a rule barring "mentally retarded females" from reproducing. Renzong and fellow ethicists went to the province and conducted an investigation followed by a multi-disciplinary conference to advocate for the affected females. Minutes of the conference were disseminated to every province in China to guide ethical decision making on this topic and an article was published in a journal.[130] That this effort on the part of Chinese ethicists took place in the 1990s shows how long they have been working to effect change in bioethics in China.

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[126] Zhang Xinqing, Zhang Wenxia, and Zhao Yandong, *The Chinese Ethical Review System and its Compliance Mechanisms*(Trust Equitable Research Partnerships, 2016), 5, accessed November 3, 2021,http://trust-project.eu/wp-content/uploads/2016/03/Chinese-Ethics-Review-System.pdf.
[127] Huaihong, *Social Ethics*, 116.
[128] Zhang Xinqing, *The Chinese Ethical Review System*, 15.
[129] Renzong Qiu, email message to author, October 21, 2021.
[130] Ibid.

Others have noted that China has consistently supported, at least in principle, international ethical standards.[131] For example, China has implemented strict laws on informed consent in order to provide patient protection in human-involved biomedical research.[132] The PRC has implemented bioethical regulations and guidelines that are similar to the United States and Europe, though it must be mentioned that many of these are not enforceable by law in China.[133] Far from being unconcerned about bioethical issues, many PRC scientists and ethicists are keenly aware that bioethical problems in China persist and are in need of attention.[134] This concern reaches to the top of the PRC system with CPC chairman Xi Jinping recently ordering a crackdown on fraud in clinical trials.[135] Additionally, new laws were enacted in 2020 in China to regulate human genome editing.[136]

Chinese ethicists and scientists should be proud of the work they have accomplished in a relatively short period of time. Many of them are also willing to openly discuss the work that remains to be done in shoring up bioethical governance in China. The work of building institutional capacity for ethical governance in biotechnology is acknowledged by Chinese researchers as slow and weak, but it is occurring and progress is being made.[137] There is a ready admission that the "PRC has a long way to go in building a research ethics administration system."[138] In a sense

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[131] Agamy, "Off With Their Heads!," 507-508.
[132] Ibid, 513.
[133] Wolfgang Hennig, "Bioethics in China." *Embo Reports* 7, no.9 (2006): 850.
[134] Zhang Xinqing, *The Chinese Ethical Review System,* 14.
[135] Michael Woodhead, "80% of China's Clinical Trial Data are Fraudulent, Investigation Finds," *BMJ Medicine*, October 5, 2016, https://www.bmj.com/content/355/bmj.i5396.
[136] Yao-Jin Peng, Xiaoru Huang, and Qi Zhou, "Ethical and Policy Considerations for Human Embryo and Stem Cell Research in China," *Cell Stem Cell* 27 (2020): 513.
[137] Zhang Xinqing, *The Chinese Ethical Review System,* 4.
[138] Ibid, 5.

bioethics in the PRC has come a long way but remains a very real work in progress, especially in the area of effective systems of ethical governance.

Areas of Concern

Despite the substantial progress that has been made by scientists and bioethicists in China, the effort to apply ethics to technology has many hurdles in front of it. Numerous challenges must be addressed in the field of bioethics, including systemic problems, interactions with international partners, and in understanding and applying ethics more generally. These problem areas undermine the advancement of bioethics in China and must be addressed for real bioethical progress to continue.

There are three main systemic areas that clearly highlight problems in the application of ethics to biotechnology in China. The first is incomplete or non-existent laws to govern biotech and the lack of application or enforcement of the bioethical laws that do exist. The second is the weakness and inconsistency of systemic actors such as ethical review committees. The third is the deficiency in ethical training across the entire biomedical spectrum in China. While this study applies primarily to the biotechnology sector in China, these same issues occur throughout the various technology sectors in China; thus, the biotech sector serves as a useful proxy to understand the wider ethics of technology issues in China.

It is accurate to argue that the legal framework governing technology ethics in China, particularly in the biotechnology sector, has made important strides in recent years. However, there remains a great deal of work to be done in enacting laws in China to address bioethics. There are now numerous regulations and guidelines covering bioethical issues in China, which is a sign of

positive progress; however, as one author noted, few of these are actually enforceable by law.[139] In vital areas such as human subjects in medical research, the laws are unequal to the task of providing adequate protections.[140] Implementation of bioethical laws that have been enacted is also a critical, if not *the* most critical, shortcoming in bioethics in China. An examination of laws and regulations governing human stem cell research discovered that there were no penalties for violating ethical regulations in this area.[141] Another examination of implementation of bioethical laws and regulations discovered that ethical legal instruments vary greatly among different regions of China and among various biotechnology institutes.[142] Another study concluded that legal and ethical standards in the cutting-edge area of neuroscience studies involving the human nervous system and human-brain inspired artificial intelligence were also lacking in China.[143] This laxity of legal oversight of bioethical concerns has created an environment of permissiveness in China. This type of permissiveness in emerging biotechnological research is of great concern both inside and outside of China and unfortunately shows every sign of continuing despite efforts of bioethicists in China to address it.[144]

Another systemic problem area is in the ethical infrastructure in China, specifically the ethical review committees. As with the legal and regulatory framework, there has been progress in building this type of ethical infrastructure in China. However, progress in establishing committees is accompanied by endemic problems that undermine the effective functioning of the

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[139] Hennig, "Bioethics in China," 850.
[140] Yuanpeng Ren, et al. "Legal Protection of the Rights of Clinical Trial Subjects in China," *The Journal of Biomedical Research* 32, no.2 (2018): 80.
[141] Yao-Jin, "Ethical and Policy Considerations," 512.
[142] Wahlberg, "China as an 'Emerging Biotech Power,'" 628.
[143] Yi Wang, et al. "Responsibility and Sustainability in Brain Science, Technology, and Neuroethics in China - a Culture-Oriented Perspective," *Neuron* 101 (2019): 377.
[144] Yao-Jin, "Ethical and Policy Considerations," 513.

entire ethical review process in China. One study noted numerous problems with ethical review committees in China, including loose organizational structures, unqualified members, little ethical training of members, and weak oversight.[145] Another study concluded that lack of standardization of membership, lackluster management, and a lack of a systematic approach to ethics review undermined the effectiveness of the ethical review system in China.[146] One researcher discovered a lack of standard operating procedures within ethical review committees in China and no standard procedures across different committees.[147] In simple terms these fundamental problems with ethical review committees suggest that ethical review is done in an off-the-cuff manner. Alternatively, it could be understood that this system is still in its infancy and needs maturation. Given that ethical review committees are an indispensable component of creating and enforcing a culture of ethics, the fact that they are lackluster in China is a major cause for concern.

Closely related to the problems with ethical review committees is another significant deficiency in the bioethical infrastructure in China: ethical education and training. Several authors have bemoaned both the low numbers of trained bioethicists and a serious lack of bioethical education in China.[148] Ethics training and education in China have not kept pace with the explosion of biotechnology and this represents a serious shortcoming. While it is true that some progress has been made in including ethics in formal education, this is an area that requires significant attention and investment to correct. Essentially, there are not enough trained ethicists to serve on review

[145] Yuanpeng, "Legal Protection," 79.
[146] Zhang Xinqing, *The Chinese Ethical Review System,* 10-13.
[147] Agamy, "Off With Their Heads!," 507-508.
[148] Zhang Xinqing, *The Chinese Ethical Review System,* 17; Agamy, "Off With Their Heads!," 508.

panels, conduct ethical studies, and train the next generation of bioethicists. This lack of education and training is a serious impediment to progress in bioethics in China.

Lack of education and training also means that serious deficiencies in the ethical views and application of ethics by PRC scientists and researchers are not corrected. There are problematic ethical viewpoints that have flourished in the biotechnology sector due in part to a lack of widespread ethics education and training. One of these is a desire to get fame and fortune quickly without concern for ethics. This get-rich-quick or get-published-easily mindset has fostered a culture in the biotech sector in China that prioritizes quick success over other concerns.[149] In this type of ethical culture professional and basic moral standards have lagged in China.[150]

Pragmatism and the idea that ends justify means remains a very powerful force in China, including in the biotechnology sector.[151] This type of morality relegates ethics to a secondary position. In the pursuit of pragmatic success, scientists and researchers in China resist ethical oversight, preferring instead to self-regulate.[152] The effects of pragmatism are lamented by bioethicists in China.[153] Another ethical pitfall is related to pragmatism: development ethics. In development ethics the cause of national development in any sector is deemed urgent, desirable, and morally heroic.[154] In development ethics anything done to further development overrides other ethical concerns. This type of ethic can, and in the case of China does, lead to very serious ethical problems.

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[149] Ruiping, "Reboot Ethics Governance in China," 185.
[150] Huaihong, *Social Ethics*, xxii.
[151] Renzong Qiu, email message to author, October 21, 2021.
[152] Ibid.
[153] Ibid.
[154] Lijing, "Chinese Biotech Versus International Ethics?," 484.

Perhaps one of the most serious deficiencies in bioethics in China is the widespread presence of fraud and dishonesty. The aforementioned development ethics serves as an enabler of this problematic behavior because as long as there is developmental progress authorities will often ignore ethical breaches. These types of problems are by no means unique to China, but in the PRC context, fraud and dishonesty have reached outsized proportions and, if not addressed, make any biotechnological effort in China fraught with ethical dilemmas. The dire problem of fraud and dishonesty manifests in a variety of ways. The most obvious is in fraudulent clinical trial and study data. One study determined that in 2016 eighty percent of clinical trial data in China was fraudulent. The same study argued that chaos reigns in the clinical trials industry in China with significant problems of data discrepancy, missing or altered data, and a marked tendency for researchers to hide problems in their trials.[155] A 2014 survey of hospitals in China found that only 21.8% of biomedical projects passed their ethical reviews.[156]

Dishonesty, particularly in dealing with international partners, is another key problem in the PRC biotechnology industry. This was highlighted by the previously discussed scandal involving harvesting of prisoner organs in 2014-2015. Chinese officials announced changes in the practice with an end to unethical use of prisoners as a source of transplantable organs. However, there were no changes to any laws, regulations, or practices. In fact, it appears that while a particular official with responsibility for this in China was saying one thing in English to an international audience, he was saying the opposite in interviews in China.[157] This type of apparent

[155] Woodhead, "80% of China's Clinical Trial Data are Fraudulent".
[156] Agamy, "Off With Their Heads!," 532.
[157] Kirk, "Historical Development and Current Status of Organ Procurement," 2.

double-speak concerning important ethical issues should give pause to international entities considering partnering with China in the field of biotechnology.

Another problem that was also brought to light by the organ transplant controversy was a culture of secrecy in the PRC government, especially over perceived sensitive issues. In the case of organ harvesting, the PRC government passed a law in 1984 making any details of prisoner organ harvesting in China a state secret.[158] This culture of secrecy pervades sensitive areas of the biotechnology sector and other technology sectors which impedes accountability and undermines the work of ethicists in China. The culture of secrecy stems in part from a deep distrust of foreigners.

China's bioethical challenges, including its deficit of trained bioethicists, is made worse by another serious challenge that pervades the culture surrounding scientists and biotechnology practitioners in China: a suspicion of foreign influence. Due to some of the historical traumas suffered by China which were explored earlier in this study, there is a certain level of distrust of outsiders, or foreigners, in China. This is exasperated in the biotechnology sector by sharp criticisms from foreigners of ethical lapses in the biotechnology sector in China. This has led to a culture of unwillingness to submit to what are viewed as foreign requirements and regulations in the biotechnology sector.[159] This tendency toward distrust of outsiders exacerbates the problem of lack of education and training because it makes it more difficult to draw upon outside expertise to shore up deficiencies in bioethics in China.

[158] Ibid, 2.
[159] Lijing, "Chinese Biotech Versus International Ethics?," 484.

One of the main reasons for the culture of secrecy, distrust of foreigners, and rampant dishonesty in the biotechnology arena is due to the influence of the Communist Party. This is because the CPC jealously guards control over all areas that it deems critical for party survival.[160] Controlling the development of ethics, especially of technology, appears to be one of these areas that the CPC deems critical for survival. The result of this is information related to ethical issues, especially ethical lapses, is often suppressed by the Party to avoid embarrassment. As noted previously, it is the CPC that pushes Chinese society toward development ethics and pragmatism. Although the CPC is trying to foster the rejuvenation of Chinese ethical systems such as Confucianism, they are doing so cynically as a means to guide the discussion of ethics and morality in such a way as to avoid challenges to their power. This is very different from an idealistic fostering of ethics and has a negative impact on the development of ethics in China.

[160] Lawrence, "China's Political System," 2.

Conclusion and Recommendations

This brief analysis of technology ethics in China reveals a very complex topic that requires thoughtful engagement to fully understand. China is neither a lawless frontier of ethics nor a paragon of virtue. The truth oscillates somewhere in the middle of these extremes. Two key underlying truths are clear. First, China is not going away as a technology power, because the PRC is committed at all levels of society to technological progress and development. Second, China is not going away as a challenge to global technology ethics.

This second truth is not necessarily negative. On the positive side, China's rediscovery of its core philosophy of Confucianism appears to be part of a larger societal move toward a more ethically conscious nation. This is a positive development that will empower China to be a valuable voice in global technology ethics. China, particularly the Communist Party, nevertheless seems to be in a reactive posture toward so-called foreign philosophical and ethical influences. If this type of thinking dominates China's approach to ethics it can lead to a global bifurcation in technology ethics which could in turn negatively impact the development of global ethical standards in important areas such as bioethics.

China, especially the Communist Party, has tremendous agency in determining how their ethical renaissance impacts its relationship to the wider world. However, nations like the US and its partners can also exercise agency to partner with China in such a way that they become net contributors to global ethical standards and governance. To exercise this type of agency requires western and other leaders to develop an understanding of China's ethical milieu including its historical and philosophical underpinnings. The ethical landscape in China is rapidly shifting and evolving. This requires constant attention to changes in China and regular interaction with ethicists

and scientists in China to stay abreast of developments. This study serves as a catalyst for the effort to develop a cross-cultural understanding of technology ethics in China.

It is virtually guaranteed that serious scandals in technology ethics, including but not limited to biotechnology, will take place in China. However, it must be kept in mind that this is also true of the US and other nations. The outside world must be thoughtful in how it approaches these types of scandals. The West or other outside institutions slamming the door to interaction and partnership with China is an extreme option that should only be considered if China, under the influence of the CPC, decides to close itself off and follow its own ethical path with no regard for global ethical standards. This is unlikely to happen. A better approach is to keep open channels of dialogue and information sharing to foster ethical best practices. With that in mind here are some recommendations based on this study. Adoption of these recommendations will provide the necessary safety precautions while also not cutting off contact between China and global technology concerns.

1. Acknowledge that China has made real, intentional progress in developing technology ethics. It is usually an easier task to see the faults in a system and more difficult to see and appreciate progress. In China's case the progress is impressive in many ways.
2. Understand that progress in advancing ethics of technology is uneven in China. Biotechnology was selected as the case area for this study primarily because of the level of progress; however, even in biotech there is an uneven distribution of progress. Prominent national-level biotech entities may have robust ethical systems in place staffed by capable practitioners while further from the center one will likely find very weak and insufficient ethical oversight regimes. There is also an

unevenness from one sector to another. Biotech and data protection have perhaps the most advanced ethical constructs while other sectors such as energy may lag.

3. Realize that the PRC can make a valuable contribution to the global ethical discussion. Confucian-inspired views on considering the social and environmental impacts of emerging technology would deepen and further global technology ethics. These views should be welcomed and incorporated into the wider discussion.
4. Proceed with caution. Technology ethics is still a work in progress in China. Despite impressive gains there is a real possibility that projects, be they biotech or from another tech sector, can fall afoul of the ethical standards of other countries or commonly agreed global norms. Know your partner if working with a technology firm in China. Do not take for granted that ethical concerns will be accounted for. Ethics must be a central aspect of any technology endeavor with China. Always keep in mind the preeminent position the Communist Party of China occupies and that if they direct a firm to behave in what an outsider would view as unethical the firm must comply.

Finally, this study highlights the need for further study in several areas. First, the role of national and/or societal level trauma in influencing policy is an area that needs scholarly attention. The national traumas that China has experienced in the modern era have arguably had a profound effect on how China approaches several issues in both foreign and domestic policy. In the context of this study, it was fascinating to connect China's traumatic national experience to its approach to technology ethics. Further study can be done on how trauma influences China's foreign and domestic policy. This approach of using trauma as a factor to examine national-level decision

making can also be applied to other nations that have experienced high levels of national or social trauma. Examples could include, but are not limited to, South Africa, Myanmar, India, and Russia. Doing so can provide important insight into how these and other nations that have experienced significant national trauma approach international relations.

Another area of study is how ethics is applied in other sectors of technology in China. Cyber, surveillance, energy, and dual-use military technology among many others are ripe for an examination of this type. Additionally, diving deeper into specific areas of biotechnology such as neuroscience, neuro weaponry, and virology (among others) could also yield important insights into technology ethics in China. As China experiences rapid changes in both its technology and ethical progress, it is important for outside observers and partners to keep abreast of new developments to guide approaches and responses to a technologically and ethically rising China.

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