*Article*

new media & society
1–18

DOI: 10.1177/14614448251317461
journals.sagepub.com/home/nms


# (Re)animating the ancestors: Digital personality emulations, ancestor veneration and ethics

**Robert Sparrow**
Monash University, Australia

**Ellen Y Zhang**
University of Macau, China

## Abstract

Veneration of paternal ancestors plays an important role in Chinese tradition. In this article, we offer some speculations about how a new 'thanatechnology' – digital personality emulation – may impact on ancestor worship. We explore the ethical issues raised by the use of personality emulations for this purpose, drawing on Confucian, Daoist and contemporary Anglo-American perspectives. For Confucians, the key questions concern the extent to which this technology automates the task of remembering and whether it is corrosive of filial piety. Daoists might be critical of personality emulations owing to a larger disagreement with Confucians about the role of ritual in a good human life. Finally, recent discussions in the Anglo-American literature suggest that the use of this technology would raise questions about the consent of the deceased to emulation, the privacy of users, the danger that users will be manipulated by the designers and/or manufacturers of emulations, and the impact of emulations on the grieving process.

## Keywords

Ancestor worship, Confucianism, Daoism, ethics, thanatechnology, virtual humans

**Corresponding author:**
Robert Sparrow, Department of Philosophy, School of Philosophical, Historical, and International Studies, Faculty of Arts, Monash University, Clayton, VIC 3800, Australia.
Email: robert.sparrow@monash.edu

Veneration of paternal ancestors plays an important role in Chinese tradition in general and in Confucianism in particular. In different historical periods, nobles or commoners were expected to maintain an ancestral shrine (*zongci* 宗祠) in the communal graveyard or in the home. The demonstration of proper respect for one's ancestors is considered to be essential to filial piety and thus to virtue. In mainland China, many ancestral shrines were destroyed or forced to become 'secularized'. However, ancestor worship of various different forms has experienced a revival since the 1980s after the Chinese government relaxed restrictions on some traditional practices. Many contemporary Chinese families are re-embracing Confucian culture by maintaining a shrine dedicated to their ancestors at home, before which they light candles and incense, and/or make offerings on the appropriate ritual occasions (Hu, 2016).

A characteristic feature of ancestral shrines is the spirit tablet or memorial tablet used to designate the seat of past ancestors, whose names are inscribed onto the tablet. In the performance of rituals, ancestors were often represented by traditional Chinese paintings or statues that portray the deceased members of one's lineage. Ever since photography became commercially available, some shrines have featured photographs instead of paintings or statues. More recently, some shrines have featured digital photos of deceased loved ones, which may allow multiple images to be displayed in succession. The display of images of ancestors expresses both the feeling of loss and of reverence. It also reflects the importance of the family line and of intergenerational ties.

In this article, we offer some speculations about how a new 'thanatechnology' (Sofka, 1997) – digital personality emulation – may impact on practices of ancestor worship. In the near future it will be possible to create sophisticated digital avatars of deceased persons, which will appear and talk like the deceased, using a combination of generative AI, informed by texts produced by the deceased, and sophisticated computer graphics engines, informed by images of the deceased. By (re)animating the ancestors who must be worshipped, such personality emulations have the potential to transform traditional ritual practice and make it more interactive and engaging. We also offer an initial discussion of the ethical issues raised by the use of personality emulation for this purpose, drawing on Confucian, Daoist and contemporary Anglo-American perspectives in order to do so.

Our discussion proceeds as follows. In the first section, 'Venerating the Ancestors', we offer a brief history of the role of ancestor worship in Chinese – and especially Confucian – tradition, noting also the existence of similar practices in other countries and religious traditions. Section two, 'Ancestral images', highlights the role played by images of ancestors in the ritual practice of ancestor veneration. In the third section, 'Animated Agents', we draw attention to the emerging technology of 'personality emulation', made possible by the combination of the advent of generative AI and increasing powerful digital animation engines. In section four, '(Re)Animating Ancestors', we offer some reasons to think that this technology is likely to taken up in China for the purpose of a more interactive engagement with (animated) ancestors. Section five, 'Confucian Concerns', explores whether there might be reasons to regret such an outcome from within the Confucian tradition. We highlight the ethical significance of the automation of the process of remembering the deceased that occurs via personality emulation and suggest that Confucians should be concerned about the possibility that the use of personality emulations

for ancestor veneration would be corrosive of the virtue of filial piety and distort our memories of our ancestors. However, Confucianism is not the only philosophical and religious tradition in China. Section six, 'Daoist Doubts', therefore explores what Daoists should think of this technology and locates this issue in the context of a larger dispute between Confucians and Daoists about the value of ritual. Finally, in the seventh section, 'Ethics and Animation', we draw attention to arguments about the ethics of the use of personality emulation in contemporary Anglo-American philosophical ethics that might also bear on its use in the context of ancestor worship. We conclude by emphasizing the need to consider these ethical issues and investigate relevant empirical questions as these systems start to be used to re-animate – in order to venerate – the ancestors.

## Venerating the ancestors

The ritual celebration of deceased and deified ancestors is one of the most important and long-lasting aspects of Chinese religious culture (Ahern, 1973; Hu, 2016). No one knows exactly when ancestor worship started in China, but most historians trace the practice back to the Shang dynasty (c. 1600–1046 BCE) when the ancestors of the noble family were thought to reside in heaven within the feudal hierarchy of other deities and gods. In the Zhou Dynasty (c. 1122-256 BCE), the performance of rituals dedicated to the veneration of deceased members of one's lineage became popular among both nobles and commoners (Cook, 2009).[1] The term *ji zu* (祭祖) literally means 'making sacrificial offerings (*ji*) to ancestors (*zu*)' as a way of reverence.

Ancestor worship is a tradition that consists of a series of rituals, practices and beliefs (Hu, 2016). It evolved in societies characterized by extended kinship networks, strong family identity and hierarchical intergenerational relations (Hu and Tian, 2018). Although our focus here is on the history and future of ancestor worship in China, it is worth observing that other societies, especially in Asia, also have traditions of ancestor worship.

For Confucius, rituals to honour ancestors are extremely important for they have educational and therapeutic functions. The practise of the ritual is a way to fulfil a respectful social duty, that is filial piety (*xiao* 孝), and learn what life is about. In Confucius' *Analects*, we read, 'When proper respect toward the dead is shown at the end and continued after they are far away, the moral force of a people has reached its highest point' (Confucius, 1998: 1:9). *Master Zhu's Family Rituals* (*Zhuzi jiali* 朱子家禮) by Zhu Xi 朱熹 (1130–1200), a noted Neo-Confucian of the Song Dynasty, includes one chapter devoted to ancestor veneration and another chapter devoted to the ancestral veneration hall, including detailed description of ceremonial activities and regulations (Zhu, 2014).

Many Confucians believed that neglecting one's ancestors brings misfortune to the family. As Raymond Dawson, a scholar of Chinese history, has observed:

> Ancestor worship was seen by the mass of the people as a reciprocal arrangement between the dead and the living, in which the latter looked after the supposed physical needs of the former, while in return the ancestors benignly participated in the affairs of the living, receiving news of important events such as births and betrothals, and advising and conferring benefits upon their descendants (Dawson, 2017: 154).

By means of the ritual practice of ancestor veneration, the unity of the family or kin group is reinforced. People feel more grounded in their own histories and are connected through their ancestors to the rest of the web of life. The significance of the role of the family in the greater society is well reflected in the Confucian ethics of 'five most important human relationships', which are (1) ruler to ruled; (2) father to son; (3) husband to wife; (4) elder brother to younger brother and (5) friend to friend (Chan, 1969: 277).

Ancestor worship is also practised in other religions in China, such as Daoism and Buddhism. One of the traditional festivals dedicated to deceased people takes place on the 15th day of the 7th month according to the Chinese lunar calendar. It is known as the Ghost Festival (*zhongyuan* 中元) in Daoism and the Ullambana (*yulanpen* 盂兰盆) in Buddhism. During the festival period, both Daoists and Buddhists perform rituals to transmute and absolve the sufferings of the deceased (Chow, 2015). Other activities include food offerings, incense burning and offering some material items (in a papier-mâché form) such as clothes and other fine goods for the visiting spirits of the ancestors. Nevertheless, filial piety as a virtue is not emphasized as much in Daoist and Buddhist traditions as in Confucianism.

Ancestor veneration has also, at times, served a social and political function (Chen and Tillman, 2014; Dean, 2003). The Chinese word *zong* 宗 means 'ancestral shrine' or 'ancestral temple' which is a combination of a roof (宀) and 'spiritual matters' (示). The imperial ancestral temple (known as Taimiao, 太廟) was a place for ceremonies honouring the ancestors of the imperial family. It was also used by the emperor as a public space where all state affairs, like war, alliances, or agricultural activities, were announced. In this sense, offering sacrifice means 'state sacrifices' or 'public sacrifices', and by doing so, the line between the religious and the secular was blurred, especially when state religion was absent in China.

## Ancestral images

Images of the ancestors played an important role in practices of ancestor veneration, which differed from the role of other objects used in rituals such as flowers, incense burners and spirit tablets: portraits evoke the 'physical presence' of ancestors to help worshippers to visualize their ancestors. In the past, it was expected that the image used in the ritual should be the 'true likeness' (*zhenrong* 真容) of a recently deceased person, or represent the 'recapturing appearance' (*zhuirong* 追容) of a person who had passed away long ago, so as to generate a unique connecting power between the living and the dead (Chen, 2019).

With the development of printing technology during the Ming dynasty (1368–1644), the use of representational images in ancestral worship in China, whether in a formal ancestral hall or a simple village shrine, increased significantly (Lu, 2006). Ancestral portraits became a symbolic gesture of filial piety and familial continuity. There were many names for ancestral images such as 'small shadows' (*xiaoying* 小影), 'small pictures' (*xiaozhao* 小照), 'shadow-images' (*yingxiang* 影像) and 'appearance' (*rongzi* 容子) and they served important ritual functions in ancestral rites (Lu, 2006). In earlier times, faces were the most important part of the portrait, since in Chinese culture 'face' can be understood as a person's image and dignity in society. To the Chinese, a person's

face is both *lian* (脸) and *mianzi* (面子): the former refers to one's physical appearance whereas the latter refers to one's honour and social standing.

With technological advances in printing, people also paid attention to other details in the portrait such as hats, shoes and cloth fabric. Wealthy families would display images at home or showcase family portraits in ancestral halls to bless their ancestors and descendants (Ebrey, 2004). These paintings, known as 'picture of family hall' (*jiatang* hua 家堂畫), were treated with the greatest respect, along with another precious family object, that is the family genealogy book, also known as 'pedigree scroll' (*jiapu* 家譜 or *zongpu* 宗譜 (Chen, 2019).

## Animated agents

Until very recently, records of deceased persons were fundamentally inert. People might possess letters written by their ancestors, photos of them, recordings of their voice or even film footage, but it was not possible to interact with these representations in any meaningful sense.

However, in the near future, realistic-looking interactive digital personality emulations will become available, which will allow people to talk to and interact with a simulacrum of their ancestors (Burden and Savin-Baden, 2019; Hurtado Hurtado, 2023; Parker, 2014; Savin-Baden, 2021; Sisto, 2020). Indeed, it is already possible to carry on a conversation with a digital avatar of a dead person in the form of 'AI Einstein' (UNEEQ: DigitalHumans.com, 2023). While these interactions are currently rather stilted, we anticipate that they will rapidly progress to being more and more natural (Lan et al., 2023).

This remarkable state of affairs has been made possible by advancements in three different technologies.

The advent of 'generative AI' based on large language models means that it is now possible for computers to carry on natural language conversations on almost any topic in a diversity of styles. By prompting these systems to adopt the identity of the author of a particular set of texts, or by using a set of texts produced by a particular author to train these systems, it is possible to get them to respond in the 'voice' of particular people and to respond to various conversational prompts in the same way as those people would (Elder, 2020; Henrickson, 2023; Hurtado Hurtado, 2023; Sisto, 2020). By providing one of these systems with a corpus of text generated by a historical individual, such as, for instance, their email, or text messages, it is possible to get them to produce a compelling impersonation of the conversation of the deceased (Bell and Gray, 2001; Rothblatt, 2014: 54–59; Tiku, 2022).

Improvements in computer graphics, driven by the development of more sophisticated software and of more powerful hardware, mean that it is now possible to produce realistic animations of the human face and body (Anderson, 2005). Indeed, it is now possible to take film footage or even a photograph and create a digital avatar of a person that can then be animated so as to be shown doing whatever one likes. While this process currently requires a great deal of computing power, advances in generative AI are also having an impact in this area and making it more plausible to imagine it being carried out on a portable computer (Rini and Cohen, 2022; Sample, 2020). A popular application

called Deep Nostalgia already uses deep learning algorithms to allow users to create short video animations from still photographs (Hern, 2021; MyHeritage, 2023).

Finally, by means of stereo microphones, stereo cameras and motion capture systems, it is now possible to capture the actions of (real) human beings and represent them in such a way that these digital avatars could recognize and respond to them (Alqahtani et al., 2020; Mehta et al., 2020). That is, as well as understanding our speech, computers can now track our movements, our gazes, and recognize and classify our facial expressions. This means that personality emulations will soon be able to respond to the body language and facial expressions of those with whom they are interacting, as well as to their typed text or spoken words.

The description of digital avatars of the sort with which we are concerned here as personality *emulations* leaves open the question of whether such entities should be thought of as (mere) imitations of the emulated individual or whether they might eventually involve a real human mind being realized in a non-biological medium (Bainbridge, 2014). In her book *Virtually Human: The Promise – and the Peril – of Digital Immortality*, and elsewhere, Martine Rothblatt has suggested that it will eventually be possible for people to achieve a form of immortality by creating emulations of their minds based on their online presence (Rothblatt, 2012, 2014. See also Bainbridge, 2014). She argues that a digital emulation of an existing, or deceased, individual that is provided with a sufficiently rich set of data about that individual will not only be able to respond to stimuli in exactly the same way as they would but will actually be able to become self-conscious and thus (what she describes as) a 'mind clone' of the original individual (Rothblatt, 2014: 10–11). In anticipation of this prospect, the organization Terasem, which describes itself as a Transhumanist 'Church', offers a service whereby people can upload a 'mind file', consisting of their email, social media messages, photographs and recollections, in the expectation that this will allow them eventually to be reincarnated in a digital avatar (LifeNaut.com, 2023; Roy, 2014; Terasem Movement Foundation, 2023).

We make no claim that personality emulations will be conscious. Indeed, we think it highly unlikely (Hurtado Hurtado, 2023). Nevertheless, it is possible that they may *appear* conscious to those who interact with them. Our concern here is with the ethical issues that will arise regarding the use of this new thanatechnology (Buben, 2015; Sofka, 1997) in the context of Confucian (and Daoist) practices of ancestor worship.

## (Re)animating ancestors

Given that ancestral portraits have, historically, played a crucial role in ritual practices of ancestor worship in China (and elsewhere), and that practices of ancestor veneration have evolved in the past as a result of technological advances in printing in the Ming era, we think that it is quite likely that, someday soon, digital personality emulations will be used in the context of – and, perhaps, transform – the ritual practice of ancestor worship. Traditional ritual procedures such as 'receiving the ancestor tablet', 'receiving the spirits', 'descent of spirits', 'serving daily food', 'reading ancestor messages' and so on are too complicated and time consuming for contemporary urbanites (Moon, 1974). The prospect of simplifying ritual practice by moving aspects of it online is attractive. Digital avatars and other smart machines are already increasingly interwoven onto the cultural

fabric of China and their applications and social impacts are continuing to expand. Many young Chinese have begun posting animations made from family photos using Deep Nostalgia or other services like it, on the 'Little Red Book', also known as Redbook (*xiaohongshu* 小紅書), one of the most popular social media sites in China. More powerful digital animation engines will permit a more interactive engagement with ancestors since animated ancestors will move, smile, look and converse as they did in real life.

There are two different ways in which personality emulations might be used in the context of ancestor veneration, each with different – and significant – implications for the material practise of the rituals associated with ancestor veneration.

First, personality emulations running on tablet computers, or similar devices, might be installed in, or on, physical shrines in place of photos or the traditional spirit tablet or memorial tablet.[2] By this means, those who approached the shrine could talk with, and relate to, an emulation of a deceased ancestor: the new technology would radically transform the experience of visiting the shrine. Since venerating ancestors at their gravesite is a popular means of practising ancestor worship, especially during the Tomb Sweeping Festival (*Qingming jie* 清明節), the use of a personality emulation, which might be provided with virtual paper money, food, incense and firecrackers, will be more environmentally friendly than a physical spirit or memorial tablet (Lu, 2009).

Second, digital avatars might form part of a virtual shrine located 'in' cyberspace. In an increasingly urbanized and mobile society, traditional forms of ancestor worship are facing severe challenges. For example, family members who used to live in the same village are now 'spread across the globe, making it harder to visit the ancestral hall or the gravesite to perform the proper ancestral sacrifices' (Tavor, 2020: 31). Meanwhile, a lack of physical space, particularly in cities, makes traditional burial practices and ancestral shrines impossible. To solve this problem, a 3D virtual cemetery was invented in Hong Kong (a city known for its high dense of population) in 2016. A virtual reality (VR) interface allows the worshippers to use a headset and gloves to 'immerse themselves in the experience' (Tavor, 2020: 31–32). A similar approach might be used in the construction of VR shrines. Because the virtual ancestral shrine will not be confined to a specific physical space, family members scattered over the globe will be able to perform rituals on the Internet. Including a digital personality emulation will allow family members to interact with an avatar of their ancestor online. In this case, the material effect of the new technology would be to 'dematerialise' the shrine and relocate the place and context of ancestor worship to wherever those venerating their ancestors are logged in to the Internet.

As we shall see in what follows, the ethical issues associated with the use of personality emulations in ancestor veneration will differ slightly depending upon which of these two possibilities one is considering.

## Confucian concerns

According to Confucians, ritual practice can be conceived as an externalization of a virtue (or virtues) in a specific social context (Tu, 1979: 5–16). Pak Hang Wong argues that, as an embodiment of communal and traditional values, Confucian rituals 'can be used to inform the design and use of technology' or to be 'more proactively, to ritualize

technology such that it can serve to guide users' and the society's responses with reference to Li' (Wong, 2020: 13). The virtue expressed through practices of ancestor veneration is filial piety, which itself involves both love and respect. The question therefore naturally arises as to whether it is plausible to think of creating, and engaging with, a digital avatar of a deceased person as an expression of love and respect. Might it not instead be disrespectful?

Clearly, it would be possible to generate avatars that were not respectful; for instance, because they were caricatures or misrepresentations of what the person was in life. Is creating an emulation disrespectful *per se* though? It might be thought that it is. The person who relies on an external aid, in the form of an avatar, to prompt them to carry out ritual observances and to maintain memories of their deceased parent (for instance) is, it might be held, less virtuous than the person who does so unaided and thus expresses less respect. Moreover, as we discuss further below, it might be argued that to venerate a simulacrum of an ancestor is to neglect the ancestor him-or-her-self, which is disrespectful.

To the extent that these arguments have force, though, they will have force against the use of photos or statues in/on shrines as well as against personality emulations. The former argument even seems to imply that maintaining a shrine as a prompt for, and locus of, ritual practice is less admirable than spontaneous voluntary acts of remembrance. That is to say, at its heart, this is an argument against the value of ritual rather than against a particular technology.[3] What it foregrounds is that ritual always/already involves a technological scaffolding of virtue through the role played by material items (candles, incense, gifts, shrines, etc.) and because ritual itself is a technology in the form of a set of social expectations and understandings (Elder, 2020: 83). If there is to be a Confucian critique of the use of personality emulations, then, it must relate to the specificity of this technology and not just to the fact that it introduces a technology into ritual practice.

What *is* novel, and potentially problematic, about personality emulation is the extent to which this technology relieves the user of the need to perform the emotional and spiritual labour that gives sense to ancestor worship – remembering the ancestor. Instead of people needing to maintain an image of their ancestors in memory while – and through – conducting the ritual, this task would be performed for them by the technology. In this, personality emulations would differ from shrines, memorial tablets and photographs, which function as prompts to memory.

If practicing a ritual were merely a matter of bringing it about that sounds were made or physical items moved around, then this would not necessarily be problematic. However, for Confucians, that a person carries out a ritual, with the appropriate spiritual attitude in doing so, is the point of the ritual – is what gives it its value. Although rituals have an external component, they also have an internal, spiritual aspect, which is essential to the cultivation of the virtues that sincere ritual practice makes possible (Tu, 1979: 5–16). Automating a ritual, or key parts thereof, as personality emulations do, risks stripping it of its meaning and value. For this reason, the use of personality emulations in ancestor veneration might actually be corrosive, rather than supportive, of the virtue of filial piety.

Insofar as personality emulations would usually be based on the history of online activities of the deceased, which are at best a partial representation of the life they lived, these avatars would also be distorted images of the deceased (Elder, 2020: 75). In particular, the temporality of the emulation and of the life on which it was based would be very different. People change as they grow and age: our recollections of our parents and grandparents typically encompass memories of them at different stages of their lives. A digital avatar would emulate only the appearance and personality of the deceased at a particular time.[4] The interactive nature of the personality emulation would more or less ensure that this partial picture of the deceased would eventually colour, colonize and/or distort the living's memories of the dead, including by crowding out memories of the deceased that were formed at different stages of their life.[5] Again, while there is some risk that photographs or statues might do the same, these technologies leave much more to the imagination and the active processes of reminiscing by which individuals sustain memories.[6] The risk that personality emulations will displace and distort our memories of our ancestors is another reason for Confucians to be concerned about this technology.[7]

Another ground for reservation about the use of personality emulations for ancestor worship is that relating to a digital avatar of an ancestor would be like relating to any number of the other digital avatars that we are likely to encounter in a world in which this technology is realized. Most of these avatars are likely to be entirely fictional – they will have personalities that are not based on the personality of any existing or historical individual. Simulacra of ancestors via personality emulations risk disappearing into, while also simultaneously helping to sustain, what Jean Baudrillard called a 'hyper-reality' – a world of media representations that have no reference to the real (Baudrillard, 1994). Yet ancestor worship requires a reference to a real historical – if deceased – individual. By fictionalizing ancestors to a much greater extent than other technologies involved in the rituals of ancestor worship, personality emulations risk undercutting a necessary condition of those rituals – that the ritual is directed towards the actual, historical, ancestor.

Finally, one of the key purposes of ancestor worship rituals and ceremonies is to create an occasion that brings family/kin members together, so familial unity and communal sociability can be maintained. A personality emulation installed in a physical shrine might assist in bringing families together in shared rituals. The avatar of the ancestor might itself remind family members of the appropriateness of ritual practises at various times and could be programmed to try to strengthen relationships within the family via various social and psychological 'nudges' (Thaler and Sunstein, 2009). Even those who had not known the deceased could develop a relationship with the deceased's avatar (Elder, 2020: 85). However, a *virtual* shrine that allowed family members to carry out ritual practices without meeting face to face risks one of the main benefits of ancestor practice – bringing people together. Virtual ceremonies may help to increase the frequency of the ritual practice (because it is relatively easy to carry out), but at the cost of no longer requiring that people meet in person at a physical location. That is, in this case, a material effect of the new technology would be to reduce the extent that the practice of ritual achieves one of its key purposes of strengthening

social bonds among the living. As with other communications technologies, the cost of overcoming distance may be the benefits of genuine community (Turkle, 2011).

## Daoist doubts

Daoism stands alongside Confucianism as one of the two great intellectual systems of China. Inevitably, by virtue of having coexisted alongside Confucianism for so long, Daoism developed in relation – and sometimes in opposition – to Confucianism. For this reason, Daoist thought constitutes an important alternative perspective to that of Confucians on the ethics of the use of personality emulations in the context of ancestor worship, as well as a source of insight in its own right.

The two leading Daoist philosophers, Laozi and Zhuangzi, tend to be critical of the ritual practices emphasized in Confucian ethics. While Confucians regard the practise of ritual to be essential to being human and to moral perfection, many Daoists have found it to be artificial and pretentious. Daoist philosophy emphasizes the spontaneous power of *ziran* 自然 (usually translated in English as 'naturalness' or 'self-so-ness') and the practice of 'going with the flow' (Zhang, 2019: 77–78). Philosophical Daoists also take a non-anthropocentric position, which does not view human beings as separate from, or above, nature. For Daoists, life and death are natural phenomenon, just like the transformation of four seasons. Therefore, the Daoist sage does not show the slightest resentment with respect to such transformations. This contrasts with the Confucian understanding of the sacrificial ancestral rituals as testifying to the essential difference between human and non-human mortality (Moeller, 2012).

These Daoist reservations about ritual are accompanied by a critique – although not an outright rejection – of technology. In the *Zhuangzi* 莊子, Zhuangzi tells us a story of Zigong and the Gardener, who have a conversation concerning the construction of a well-sweep:

> I've heard my teacher say, where there are machines, there are bound to be machine worries; where there are machine worries, there are bound to be machine hearts. With a machine heart in your breast, you've spoiled what was pure and simple, and without the pure and simple, the life of the spirit knows no rest. Where the life of the spirit knows no rest, the Way will cease to buoy you up. It's not that I don't know about your machine – I would be ashamed to use it! (Zhuangzi, 2013: 91).

According to Zhuangzi, then, technology is to be distrusted because of the risk that it will lead to a 'machine mind' (*jixin* 機心). His discussion suggests that Daoists should be concerned about the possibility that the use of digital avatars will lead to ritual practice becoming mechanical and artificial – the antithesis of the spontaneous and natural exercise of freedom to which Daoists aspire.

However, the English term 'Daoism' fails to distinguish between philosophical Daoism and religious Daoism. *Religious* Daoism is sympathetic to some of the ethical values in Confucianism, including filial piety. Religious Daoism follows popular Chinese religious beliefs in holding that the soul of a departed family member consisted of a *yin* component known as the *po* (associated with the grave) and a *yang* component known as

the *hun* (associated with the ancestral worship tablet). According to Daoism, each part of the soul demands ritual attention and Daoists have developed some distinctive rituals for the dead, such as the Daoist ritual of 'Scattered Purgatory' (*po diyu* 破地獄) which intends to help the newly dead release their souls from a state between life and death (Capitanio, 2020: 43–44).

Religious Daoists are also more sympathetic to technology than their philosophical counterparts. A major concern of religious Daoism, which focuses on the cosmic balance maintained and regulated by the Dao, is longevity and how to achieve immortality through the practice of alchemy and techniques of health preservation. For example, in *The Master who Embraces Simplicity* (*Baopuzi* 《抱朴子》) by Ge Hong 葛洪 (283–343), a religious figure who played a pivotal role in the transmission of both internal and external alchemy in Daoism, we find a detailed discussion on the use of alchemical gold and silver, which, when ingested, will supposedly provide longevity and immortality (Ware, 1966: 261–278). Moreover, Daoist religious practitioners believe in a world of spirits and ghosts that can be controlled by amulets and magic, which are themselves a form of technology. For these reasons, some religious Daoists may be tempted by the use of digital avatars in ancestor veneration, although, to the extent that this reflects cultural commitments they share with Confucians, they should also be mindful of the concerns discussed in the previous section.

## Ethics and animation

There is a burgeoning discussion in the 'Western' tradition of Anglo-American philosophy of the ethics of the use of digital personality emulations, their likely impacts on social practises of grieving and mourning, and their implications for social understandings of death itself (Burden and Savin-Baden, 2019; Elder, 2020; Moreman and Lewis, 2014; Rothblatt, 2014; Wilks, 2010). Some of the questions raised in these discussions are clearly relevant to the use of such emulations in the context of ancestor worship, and for that reason, we briefly survey them here.

One obvious concern relates to whether an individual's prior consent (before their death) is required in order to create an avatar of them after they die (Budnik and Tedeev, 2023; Sofka, 1997; Wong, 2023). In some cases, presumably, children will have the consent of their parents or grandparents to create personality emulations, but in other cases, they may not. Questions about the validity of consent provided by a person's executor, who might be thought to be an appropriate surrogate decision-maker for the deceased, arise here, especially when it comes to the use of text and images left behind by the deceased to create a personality emulation (Harbinja, 2022). Whether it would be ethical to proceed in the absence of consent by the deceased or their executor depends on larger questions about the extent to which individuals have rights over their images and public persona and about the extent to which rights possessed by living individuals continue to impose duties on others after their death. We might also think that there was a role for analogy in informing our conclusions on this matter. We would not ordinarily think that we needed someone's consent before we put their photo on our mantlepiece after their death, suggesting that we need not worry about putting an animation of them in an altar. This analogy might be contested by pointing out that the photo was taken while they

were alive, presumably with their consent, while emulations will usually be created after someone has died. There is, moreover, a further set of questions that arise in relation to personality emulations, which does not arise – or, at least, not to the same degree – with photos, regarding the extent to which the emulation should be faithful to the reality of the character of the deceased or should represent them in an idealized form or, perhaps, a form that best serves the psychological needs of their descendants.[8] Again, precisely, how this question should be resolved, and by whom, remains unclear.[9]

Conversely, the use of personality emulations raises significant issues about the privacy of those interacting with emulations and also the extent to which emulations might be programmed to shape the behaviour of users to the benefit of the companies that manufacture the technology (Jecker et al., 2024). Insofar as personality emulations will look and sound like their ancestor, who would likely have respected their privacy, users may overlook the fact that the emulation system will collect, process and even disseminate information related to those with whom it interacts. Those engaged in ancestor worship will sometimes reveal information about themselves that is deeply personal and that they would be reluctant to have communicated to third parties or used for any purpose other than the ritual practice itself. Interactions with personality emulations will also affect how users feel and behave. People dealing with grief, or otherwise feeling strong emotions, in the course of interactions with digital avatars of the deceased may be poorly placed to critically reflect on the shape and course of those interactions and thus vulnerable to being manipulated by the manufacturers of avatars to the latter's advantage, for instance, by encouraging users to purchase particular products. This risk may need to be addressed by regulation.

Another issue, which has loomed large in recent discussions of the ethics of artificial companions more generally, relates to the extent to which the design of such entities is unethical by virtue of encouraging people to form and maintain false beliefs about the nature of the entity with which they are interacting (Boden et al., 2017; Sharkey and Sharkey, 2021; Sparrow and Sparrow, 2006; Sullins, 2012). A certain amount of self-deception is arguably necessary in order to be motivated to spend time relating to an algorithm. It seems doubtful that if people were fully aware that they were interacting with a clever computer programme, rather than with their ancestor, they would gain much satisfaction from the experience. The designers of artificial companions must, therefore, strive to encourage such deception through the design of the technology in order for it to work. However, designing a technology to deceive its users is *prima facie* unethical (Sparrow and Sparrow, 2006). Whether it is *all-things-considered* unethical will depend both on one's larger ethical framework and on the extent of benefits that might flow to users from being deceived (Blackford, 2012; Schermer, 2007). It might also be argued that concerns about deception, or encouraging self-deception, are misplaced in the context of discussions of the use of personality emulations in practices of ancestor worship. To the extent to which one thinks that such practices themselves already involve a certain amount of self-deception, it may seem unfair to single out the design of personality emulations as morally problematic for encouraging self-deception.

The use of personality emulations might also be criticized for making it more difficult for people to 'let go' of the deceased emotionally and to build new relationships in place

of their relationship with them (Bao and Zeng, 2024; Cann, 2017: 313–314; Elder, 2020: 75). Buben (2015), following Kierkegaard, argues that an authentic relationship to the death of a loved one requires that we are conscious of their absence rather than try to keep them present. In the larger literature on artificial companions, some authors have expressed the worry that relationships with these entities might 'crowd out' relationships with real human beings (Jecker et al., 2024; Lederman, 2023; Turkle, 2011). Unlike real friends, artificial companions can be available 24 hours a day, seven days a week (Jecker et al., 2024). They may also be programmed so as to have the sole goal of maintaining user engagement. Real people may struggle to compete with digital friends when it comes to the attention of others. Similarly, there is a risk that interactions with personality emulations of a deceased parent or grandparent will prove so psychologically compelling that they will hamper users coming to terms with the death of their relative. Again, however, such concerns may have less force in the context of practices of ancestor worship, which themselves might be defended as helping people to process their grief at the death of a parent or grandparent by providing cultural narratives, and a ritual practise, to allow them to transition to a new relationship with the deceased (Elder, 2020).

Finally, as this discussion suggests, the development of digital personality emulations might impact on social understandings of death more generally (Burden and Savin-Baden, 2019; Hurtado Hurtado, 2023; Lagerkvist, 2021; Rothblatt, 2014; Savin-Baden, 2021). This is most obvious in relation to the fantasies of those transhumanists who hold that the technologies that enable digital avatars will eventually develop to the point that personality emulations will constitute a form of 'mind uploading' that enables the consciousnesses of individuals to survive the death of their bodies (Rothblatt, 2014; Roy, 2014; Terasem Movement Foundation, 2023). Should this ever become true – or even just if this claim comes to be widely believed – then presumably people might cease to fear their own deaths, might care much less about the death of others, and might mark death – if they mark it all – with rituals of celebration rather than of mourning. However, insofar as social practices of grieving and mourning are one of the main mechanisms whereby cultural understandings of death are expressed and transmitted, changes in these practices as a result of the development of new technologies should be expected to impact on how people think and feel about death and dying even if – as we suspect is likely – these new technologies fail to render us immortal. For instance, Amanda Lagerkvist (2021) has suggested that the emergence of a 'digital afterlife' reinscribes the importance of the human body and of mortal remains at the same time as it allows the dead to 'live' online without these. For this reason, claims about the likely impact of digital personality emulations on how people will conceptualize and relate to death in the future are also relevant to debates about the ethics of the use of these technologies in the context of ritual practises of ancestor worship.

## Conclusion

New technologies are used in unexpected ways to unanticipated ends with unintended consequences. We think it possible – even likely – that the emerging technology of digital personality emulation will be adopted for use in ritual practices of ancestor worship in China and other nations where ancestor veneration is popular. Insofar as ritual practices

are always already scaffolded by technologies, we have argued that the use of this new technology in this role cannot be rejected out of hand. Instead, we have suggested, the key questions for Confucians about the wisdom of the use of this technology in ancestor worship concern the extent to which it automates the task of remembering that sits at the heart of ancestor veneration and the extent to which this is corrosive of the virtue of filial piety. Personality emulations also risk promoting a distorted understanding of the historical life of the deceased and contributing to the growth of a hyper-reality: in some roles, they may also undermine the social bonds that ritual practices would otherwise maintain. We have also suggested that philosophical Daoists are likely to have concerns about whether engaging with personality emulation would lead to the development of a 'machine mind' antithetical to the capacity for spontaneous right action to which Daoists aspire. Philosophical Daoists – and, perhaps, to a lesser extent – religious Daoists might also be critical of the use of this technology owing to a larger disagreement with Confucians about the role of ritual in a good human life. Finally, as *per* recent discussions in the Anglo-American philosophical literature of the ethics of personality emulations more generally, the use of this technology would raise a range of pressing ethical questions about the consent of the deceased to emulation, the fidelity of the emulation, the privacy of users, the danger that users will be manipulated by the designers and/or manufacturers of emulations, and the impact of the technology on the grieving process and on social attitudes towards death more generally. Insofar as the impact of personality emulations on privacy, relationships with the deceased and the way people think about death, as well as the extent to which the designers of emulations try to shape the behaviour of users, will be empirical matters, it will be vitally important to pay attention to these matters if – and as – personality emulations start to be used for ancestor veneration. More generally, the ethical questions we have highlighted here will need to be confronted and, hopefully, resolved.

## Acknowledgements

The authors thank Professor Ruiping Fan and Professor Sungmoon Kim for the invitation to the East-West Dialogue at the City University of Hong Kong, at which the conversations that led to this article took place. Professor Sparrow is an Associate Investigator in the Australian Research Council Centre of Excellence for Automated Decision-making and Society (grant no. CE200100005) and worked on this article in this role.

## Author contributions

RS and EZ each made substantial contributions to the conception of the work. RS wrote an initial outline after a conversation with EZ. RS contributed the first drafts of a majority of the sections, while EZ contributed the first drafts of the remaining sections. Both authors then collaboratively revised the entirety of the work and approved the version to be published.

## Funding

The author received no financial support for the research, authorship and/or publication of this article.

## ORCID iD

Robert Sparrow https://orcid.org/0000-0001-6093-9456

## Notes

1. It should be noted that ancestor worship in ancient China is a complex syncretism of different philosophies and religions. Some people maintain the tradition of sacrificial offerings to ancestors, while others deny the existence of ancestral spirits. For a more detailed discussion, see Brashier (2011: 1–102).
2. For an account of the use of interactive video linked to tombstones in the United States, see Cann (2017: 309–310). For a discussion of digital media in 'Western' funerary practices more generally, see Arnold et al. (2018). For an account of the addition of digital media to shrines in Japan, see Gould et al. (2019).
3. As we discuss further below, Daoist critics of Confucian ritual practice have indeed developed this line of criticism of ritual more generally.
4. It, would, of course, be possible to create digital personality emulations that evolved and changed over time and/or in the course of interactions with their descendants. However, by virtue of being a function of different 'experiences', this evolution would differ from the historical development of the personality of the deceased; nor is it clear that people would want emulations that 'aged' after the death of the person emulated.
5. We thank an anonymous referee for drawing our attention to this issue.
6. Roland Barthes' meditations on the relationship between photography, memory and death in *Camera Lucida*, are an important reference point in this context (Barthes, 1993). We thank an (other) anonymous referee for reminding us of the relevance of this discussion.
7. It must be admitted that these concerns have less force when it comes to distant ancestors of whom their living descendants have no memory. In such cases, the gap between photographs and personality emulations is less stark.
8. The equivalent question in relation to photos would be whether a photo on a shrine should be representative or flattering.
9. Our thanks to an anonymous referee for drawing our attention to this issue.

## References

Ahern EM (1973) *The Cult of the Dead in a Chinese Village*. Stanford, CA: Stanford University Press.

Alqahtani F, Banks J, Chandran V, et al. (2020) 3D face tracking using stereo cameras: a review. *IEEE Access* 8: 94373–94393.

Anderson J (2005) What's wrong with this picture? Dead or alive: protecting actors in the age of virtual reanimation. *Loyola of Los Angeles Entertainment Law Review* 25(2): 155–202.

Arnold M, Gibbs M, Kohn T, et al. (2018) *Death and Digital Media*. London: Routledge.

Bainbridge WS (2014) *Personality Capture and Emulation*. London: Springer.

Bao A and Zeng Y (2024) Embracing grief in the age of deathbots: a temporary tool, not a permanent solution. *Ethics and Information Technology* 26: 7.

Barthes R (1993) *Camera Lucida: Reflections on Photography* (trans. Howard R). London: Vintage.

Baudrillard J (1994) *Simulacra and Simulation* (trans. Glaser SF). Ann Arbor, MI: University of Michigan Press.

Bell G and Gray J (2001) Digital immortality. *Communications of the ACM* 44(3): 29–31.

Blackford R (2012) Robots and reality: a reply to Robert Sparrow. *Ethics and Information Technology* 14: 41–51.

Boden M, Bryson J, Caldwell D, et al. (2017) Principles of robotics: regulating robots in the real world. *Connection Science* 29(2): 124–129.

Brashier KE (2011) *Ancestral Memory in Early China*. Boston, MA: Harvard University Press.
Buben A (2015) Technology of the dead: objects of loving remembrance or replaceable resources? *Philosophical Papers* 44(1): 15–37.
Budnik R and Tedeev A (2023) Initial designs of artificial humans: intellectual property and ethical aspects. *Law, Innovation and Technology* 15(1): 222–240.
Burden D and Savin-Baden M (2019) *Virtual Humans: Today and Tomorrow*. Boca Raton, FL: CRC Press, Taylor & Francis Group.
Cann CK (2017) Digital memorials. In: Moreman CM (ed.) *The Routledge Companion to Death and Dying*. London: Routledge, pp. 307–316.
Capitanio J (2020) Ritual and self-cultivation in the Daoist practice of 'oblatory refinement'. *Numen* 67(1): 29–72.
Chan W-T (1969) *A Source Book in Chinese Philosophy*. Princeton, NJ: University Press.
Chen W-C (2019) The visuality of ancestral images used in worship: from portraits to prints. In: Cheng W-C and Jiang Y (eds) *Gods in My Home: Chinese Ancestor Portraits and Popular Prints*. Toronto, ON, Canada: Royal Ontario Museum, pp. 17–41.
Chen X and Tillman HC (2014) Ghosts, gods, and the ritual practice of local officials during the Song: with a focus on Zhu Xi in Nankang prefecture. *Journal of Song-Yuan Studies* 44(1): 287–323.
Chow SK (2015) *Investigation of Ghost Month – Zhong Yuan, Ullambana and Hungry Ghost Festivals*. Hong Kong: Zhonghua Books.
Confucius (1998) *The Analects* (trans. Lau DC). New York: Penguin Classics.
Cook CA (2009) Ancestor worship during the Eastern Zhou. In: Lagerwey J and Kalinowski M (eds) *Early Chinese Religion: Part One: Shang through Han (1250 BC-220 AD)*. Leiden: Brill, pp. 235–279.
Dawson RS (2017) *The Chinese Experience*. New York: Phoenix Press.
Dean K (2003) Local communal religion in contemporary South-East China. *The China Quarterly* 174: 338–358.
Ebrey PB (2004) The incorporation of portraits into Chinese ancestral rites. In: Kreinath J, Hartung C and Deschner A (eds) *Dynamic of Changing Rituals: The Transformation of Religious Rituals with Their Social and Cultural Context*. New York: Peter Lang, pp. 129–140.
Elder A (2020) Conversation from beyond the grave? A Neo-Confucian ethics of chatbots of the dead. *Journal of Applied Philosophy* 37(1): 73–88.
Gould H, Kohn T and Gibbs M (2019) Uploading the ancestors: experiments with digital Buddhist altars in contemporary Japan. *Death Studies* 43(7): 456–465.
Harbinja E (2022) *Digital Death, Digital Assets and Post-Mortem Privacy*. Edinburgh: Edinburgh University Press.
Henrickson L (2023) Chatting with the dead: the hermeneutics of thanabots. *Media, Culture & Society* 45(5): 949–966.
Hern A (2021) Deep Nostalgia: 'creepy' new service uses AI to animate old family photos. *The Guardian*, 2 March. Available at: https://www.theguardian.com/technology/2021/mar/01/deep-nostalgia-creepy-new-service-ai-animate-old-family-photos (accessed 6 November 2023).
Hu A (2016) Ancestor worship in contemporary China: an empirical investigation. *China Review* 16(1): 169–186.
Hu A and Tian F (2018) Still under the ancestors' shadow? Ancestor worship and family formation in contemporary China. *Demographic Research* 38: 1–36.
Hurtado Hurtado J (2023) Towards a postmortal society of virtualised ancestors? The Virtual Deceased Person and the preservation of the social bond. *Mortality* 28(1): 90–105.
Jecker N, Sparrow R, Lederman Z, et al. (2024) Digital companions to combat loneliness and social isolation: ethics concerns and policy recommendations. *Hastings Center Report* 54(1): 7–12.

Lagerkvist A (2021) Embodiment: the digital afterlife. In: Campbell HA and Tsuria R (eds) *Digital Religion: Understanding Religious Practice in Digital Media*. 2nd ed. London: Routledge, pp. 221–229.

Lan C, Wang Y, Wang C, et al. (2023) Application of ChatGPT-based digital human in animation creation. *Future Internet* 15(9): 300–318.

Lederman Z (2023) Technological solutions to loneliness – are they enough? *Bioethics* 37(33): 275–284.

LifeNaut.com (2023) Welcome to LifeNaut.com: create your Mindfile and Biofile today. Available at: https://www.lifenaut.com/ (accessed 6 November 2023).

Lu M (2009) Ancestor worship can be eco-friendly, EPA shows. *Taipei Times*, 1 April. Available at: https://www.taipeitimes.com/News/taiwan/archives/2009/04/01/2003439922 (accessed 16 October 2023).

Lu Y (2006) The worship of ancestral portraits in the Southern area of Ming and Qing dynasties" (<明清時期華南地區的祖先畫像崇拜習俗>). *History Studies of Xiamen University* 2: 181–197.

Mehta D, Sotnychenko O, Mueller F, et al. (2020) XNect: real-time multi-person 3D motion capture with a single RGB camera. *ACM Transactions on Graphics* 39(4): 82.

Moeller H-G (2012) Daoist criticisms of Confucian sacrificial rites. *Sophia* 51: 283–292.

Moon SG (1974) Ancestor worship in Korea: tradition and transition. *Journal of Comparative Family Studies* 5(2): 71–87.

Moreman CM and Lewis AD (2014) *Digital Death: Mortality and beyond in the Online Age*. Santa Barbara, CA: Praeger.

MyHeritage (2023) Animate your family photos. Available at: https://www.myheritage.com/deep-nostalgia (accessed 6 November 2023).

Parker L (2014) How to become virtually immortal. *The New Yorker*, 4 April. Available at: https://www.newyorker.com/tech/annals-of-technology/how-to-become-virtually-immortal (accessed 6 November 2023).

Rini R and Cohen L (2022) Deepfakes, deep harms. *Journal of Ethics and Social Philosophy* 22(2): 143–161.

Rothblatt M (2012) The Terasem mind uploading experiment. *International Journal of Machine Consciousness* 4(1): 141–158.

Rothblatt MA (2014) *Virtually Human: The Promise – and the Peril – of Digital Immortality*. New York: St. Martin's Press.

Roy J (2014) The rapture of the nerds. *Time*, 17 April. Available at: https://time.com/66536/terasem-trascendence-religion-technology/ (accessed 6 November 2023).

Sample I (2020) What are deepfakes – and how can you spot them? *The Guardian*, 13 January. Available at: https://www.theguardian.com/technology/2020/jan/13/what-are-deepfakes-and-how-can-you-spot-them (accessed 6 November 2023).

Savin-Baden M (2021) *AI for Death and Dying*. Boca Raton, FL: CRC Press.

Schermer M (2007) Nothing but the truth? On truth and deception in dementia care. *Bioethics* 21(1): 13–22.

Sharkey A and Sharkey N (2021) We need to talk about deception in social robotics! *Ethics and Information Technology* 23(3): 309–316.

Sisto D (2020) *Online Afterlives: Immortality, Memory and Grief in Digital Culture* (trans. McClellan-Broussard B). Cambridge, MA: MIT Press.

Sofka CJ (1997) Social support 'internetworks', caskets for sale, and more: thanatology and the information superhighway. *Death Studies* 21(6): 553–574.

Sparrow R and Sparrow L (2006) In the hands of machines? The future of aged care. *Minds and Machines* 16: 141–161.

Sullins JP (2012) Robots, love, and sex: the ethics of building a love machine. *IEEE Transactions on Affective Computing* 3(4): 398–409.
Tavor O (2020) Embodying the dead: ritual as preventative therapy in Chinese ancestor worship and funerary practices. *Journal of Ritual Studies* 34(1): 31–42.
Terasem Movement Foundation (2023) Terasem Movement Foundation. Available at: https://terasemmovementfoundation.com/ (accessed 6 November 2023).
Thaler RH and Sunstein CR (2009) *Nudge: Improving Decisions about Health, Wealth, and Happiness*. New York: Penguin.
Tiku N (2022) 'Chat' with Musk, Trump or Xi: ex-Googlers want to give the public AI. *The Washington Post*, 7 October. Available at: https://www.washingtonpost.com/technology/2022/10/07/characterai-google-lamda/ (accessed 11 November 2023).
Tu W (1979) *Humanity and Self-Cultivation: Essays in Confucian Thought*. Berkeley, CA: Asian Humanities Press.
Turkle S (2011) *Alone Together: Why We Expect More from Technology and Less from Each Other*. New York: Basic Books.
UNEEQ: DigitalHumans.com (2023) Digital Einstein: a genius for the AI Era. Available at: https://www.digitalhumans.com/case-studies/digital-einstein (accessed 11 November 2023).
Ware JR (1966) *Alchemy, Medicine and Religion in the China of A.D. 320: The Nei Pien of Ko Hung*. Cambridge, MA: MIT Press.
Wilks Y (ed.) (2010) *Close Engagements with Artificial Companions: Key Social, Psychological, Ethical and Design Issues*. Philadelphia, PA: John Benjamins.
Wong P-H (2020) Why Confucianism matters in ethics of technology. In: Vallor S (ed.) *Oxford Handbook of Philosophy of Technology*. Oxford: Oxford University Press, pp. 609–628.
Wong WH (2023) The creepy new digital afterlife industry: these companies could bring you back – without your consent. *IEEE Spectrum* 60(11): 38–43.
Zhang EY (2019) Forgetfulness and flow: 'happiness' in Zhuangzi's Daoism. *Science, Religion & Culture* 6(1): 76–84.
Zhu X (2014) *Chu Hsi's Family Rituals: A Twelfth-Century Chinese Manual for the Performance of Cappings, Weddings, Funerals, and Ancestral Rites* (trans. Ebrey PB). Princeton, NJ: Princeton University Press.
Zhuangzi (2013) *The Complete Works of Zhuangzi* (trans. Watson B). New York: Columbia University Press.

## Author biographies

Robert Sparrow is a Professor in the Philosophy Program, and an Associate Investigator in the Australian Research Council Centre of Excellence for Automated Decision Making and Society, at Monash University, where he works on ethical issues raised by new technologies. He completed a B.A. (Hons) at the University of Melbourne and a Ph.D. in philosophy at the Australian National University. He has served as co-chair of the IEEE Technical Committee on Robot Ethics and was one of the founding members of the International Committee for Robot Arms Control.

Ellen Y Zhang holds a Ph.D. in Philosophy of Religion from Rice University. She is Professor and Head in the Department of Philosophy and Religious Studies at the University of Macau. Her research interests include Chinese philosophy (Daoism and Buddhism) and comparative studies in philosophy, religion, and ethics.