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RESEARCH ARTICLE

Epilogue: the many worlds of rock(et) stars

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Abstract

This epilogue considers the approach and conception of this collection, highlighting key analytical strands in the essays while also suggesting possible avenues of further research. It spotlights the global nature of their analysis, which offers one structural framework – individual scientific personas and the often transnational networks which they inhabit – as a possible avenue to imagine a so-called global Space Age. The epilogue also investigates possible frames for further analyses, particularly regarding gender and translation. Men dominate the pantheon of space personas, which, I argue, is a function of the way popular discourses about space travel are still dominated not only by patriarchal and often misogynistic tropes, but also by how we define 'technology' itself as essentially a male domain of activity. More broadly, we need further investigation of multiple and gendered erasures involved in the creation of male space personas. Similarly, the kinds of tools, work and strategies the space personas deployed to translate their visions across different social, discursive, cultural and temporal domains require attention. In particular, one can imagine that the afterlife of these personas will be susceptible to change and alteration as their messages, reputations, and principal attachments are continually reshaped by historical change, popular culture, and academic currents.

They advocate, they inspire and they predict. Sometimes they explore the unknown. They all appear in culture as manifestations, avatars and paragons of our persistent fascination with the cosmos. Famous, charismatic, imbued with authority, and linked often explicitly with the nation, these men (almost always men) provide an organizing logic to what Alexander C.T. Geppert has theorized as 'astroculture', the 'heterogenous array of images and artifacts, media and practices that all aim to ascribe meaning to outer space while stirring both the individual and the collective imagination'.[1] Space evokes some names familiar to the current news cycle – Elon Musk, Jeff Bezos, Richard Branson and others – but as Geppert helpfully reminds us, the tradition of such persons, as well as their 'public facades that develop into distinct entities of their own', i.e. their personas, can be traced back to the 1920s.[2] As many historians have chronicled, this decade was marked by an efflorescence of interest in the feasibility of travelling to and through outer space. Freedom from gravity seemed to summon both the logic of mathematical equations and more metaphysical meditations on freedom from the ills of society. A few key figures arose through the miasma early on, identified as genius–prophets, such as the Russian theorist of Polish origin

[1] Alexander C.T. Geppert, 'European astrofuturism, cosmic provincialism: historicizing the Space Age', in Alexander C.T. Geppert (ed.), *Imagining Outer Space: European Astroculture in the Twentieth Century*, London: Palgrave Macmillan, 2012, pp 3–24, 6–9.

[2] See the introduction to the current special issue: Alexander C.T. Geppert, 'Rocket stars, space personas and the global Space Age', *BJHS*, this issue, n. 46.

Konstantin Tsiolkovskii, the Austro-Hungarian-born German physicist Hermann Oberth, and the American experimenter Robert Goddard, whose collective musings constituted a map for a younger generation of space enthusiasts. These were astroculture's first luminaries, whose names were shared in informal networks spanning from Leningrad to Berlin to Vienna to London to New York.[3]

To what degree and on what terms such names penetrated into the broader public imagination, i.e. beyond the small world of space enthusiasts, is part of the remit of the essays presented here. It is unarguably clear that in the postwar era, with the perceived power of technoscience sutured to national prestige, the promise of outer space acquired an almost mystical affect – linked as much to cold hard science as to unfettered imagination, a void and a vehicle for a generation to fill in their futures. The old guard from the late nineteenth and early twentieth centuries – among them Tsiokovskii, Oberth and Goddard – were now repackaged for a new audience by such intrepid self-styled curators of space history as the German-born American writer Willy Ley, who rescued from oblivion obscure details about the earlier cohort and presented the march to space as the work of important men who imagined, proposed, created and intervened at key moments its history.[4] It is probably not a coincidence that the three so-called founding fathers of astronautics – Tsiolkovskii, Goddard, and Oberth – came from the three nations most identified with the beginnings of rocketry and space travel, the Soviet Union, the United States and Germany. The fit was too perfect to be challenged and left only a few rough edges – other lesser claimants to the 'big three' – to be humoured and then dismissed as needed.[5]

As I have argued elsewhere, the archetype of the 'founding figure' serves a distinct function in popular imaginaries of space exploration that firmly links it with national imperatives.[6] For nations engaged in space activities, beginning with the Soviet Union and the United States, but later including many European nations, as well as China, Japan and India, popular discussions about founding fathers have always included certain repeated motifs: they implicitly link space programmes with indigenous ('home-grown') development, they connect spaceflight as fundamentally a problem of national development, and they provide rhetoric for justifying expenditures in space, especially when the expense of such investments is not universally supported. By linking space programmes with founding figures, these multiple questions are pre-emptively answered in the public discourse since the individuals themselves usually embody elements of this triad, self-made achievers who devoted themselves to science in service of the nation.

The 'founding figure' archetypes did not arrive out of a vacuum but rather drew upon a longer tradition of similar tropes. Most European nations, for example, reinforce narratives that they have founding fathers for particular scientific and applied scientific fields, such as physics, chemistry, biology, mathematics, computer science and so on. These narratives centre around an individual who is not only a deep thinker but also a builder of institutions,

[3] For the original classic work on the so-called German space fad see Michael J. Neufeld, 'Weimar culture and futuristic technology: the rocketry and spaceflight fad in Germany, 1923–1933', *Technology and Culture* (1990) 31(4), pp. 725–52; for the Soviet Union see Asif Siddiqi, 'Imagining the cosmos: utopians, mystics, and the popular culture of spaceflight in revolutionary Russia', *Osiris* (2008), 23, pp. 260–88; and for Great Britain see Oliver Dunnett, *Earth, Cosmos and Culture: Geographies of Outer Space in Britain, 1900–2020*, Abingdon: Routledge, 2021. For summaries of the activity in the United States, the United Kingdom, Austria, France, Italy, the Netherlands, Japan and Argentina in the 1920s and 1930s see Frank H. Winter, *Prelude to the Space Age: The Rocket Societies, 1924–1940*, Washington, DC: Smithsonian Institution Press, 1983, pp. 87–112.

[4] Jared S. Buss, *Willy Ley: Prophet of the Space Age*, Gainesville: University Press of Florida, 2017.

[5] Michael J. Neufeld, 'The three heroes of spaceflight: the rise of the Tsiolkovskii–Goddard–Oberth interpretation and its current validity', *Quest: The History of Spaceflight Quarterly* (2012) 19, pp. 4–13.

[6] Asif A. Siddiqi, 'Spaceflight in the national imagination', in Steven J. Dick (ed.), *Remembering the Space Age*, Washington, DC: NASA, 2009, pp. 17–35.

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as well as someone who bequeathed a substantial system (of research, education and so on) for the good of the nation. There is a paternalistic tone in these articulations, most strikingly communicated in the use of the word 'father'. They are benevolent, wise and caring, but also forceful. They know what is best for you.

With the advent of the material phase of the Space Age, marked by the launch of the Soviet Sputnik satellite in 1957, these 'founding fathers', as well as many new space personalities, entered the world of space advocacy, by which I mean that their primary identification became less their scientific works than their articulations and exhortations that space exploration is both fundamentally desirable and inevitable. Many of them are the subject of the insightful essays in this special issue. Undoubtedly enabled by rapid expansion of globalized mass media, including telecommunications, the words of space proselytizers such as Arthur C. Clarke or Wernher von Braun or Patrick Moore could be circulated quickly and effectively in books, on television and on the radio in ways that were impossible for an earlier generation.[7] In other words, the kind of transformative future that many of the space persons imagined and advocated for itself allowed their fame and authority to spread far beyond the relatively small circles of astroculture communities.

Cosmonauts and astronauts also played a particularly potent and visible role in both articulating and advocating for the perceived benefits of space travel while at the same time helping to redefining the nature of the modern 'space persona', a distinct creation of an individual's public identity used to navigate the public world, separate from the person himself.[8] Spacefarers such as Yuri Gagarin and John Glenn drew as much from being rocket stars as from being rock stars – handsome, charismatic, exuding a slight undertone of risk taking, as if the laws of nature themselves were pliable, where 'pushing the envelope' was something to do rather than something to avoid. Lacking the cultural currency of a Hollywood, Soviet culture venerated and celebrated cosmonauts as new, dynamic role models for the post-Stalinist generation whose every pronouncement, especially homilies about the power of space technology to reconfigure the Soviet present into the Soviet future, were meticulously predetermined by official Party apparatchiks.[9] As Andrew L. Jenks and others have shown, there were also deep contradictions in this image: cosmonaut personas represented the possibility of *individual* stardom in a society whose avowed ideological commitment was to the collective; this tension was never fully resolved, although death usually provided a convenient pretext to stabilize this ambivalence or at least to take control of its flexibility. The untimely death of the first cosmonaut, Yuri Gagarin, at the age of thirty-four in 1968 allowed the Soviet Party apparatus to memorialize him as a saint (and a rocket star), his celebrity status now proving particularly useful as an organizing memory, adaptable to every function from nostalgia to celebration to speculation.[10]

[7] For biographies see Michael J. Neufeld, *Von Braun: Dreamer of Space, Engineer of War*, New York: Vintage Books, 2007; Neil McAleer, *Sir Arthur C. Clarke: Odyssey of a Visionary*, New York: Rosetta Books, 2013; Patrick Moore, *The Autobiography*, Stroud: Sutton Publishing, 2011. For Moore see also Oliver Dunnett, 'Patrick Moore, Arthur C. Clarke, and "British outer space" in the mid-twentieth century', *Cultural Geographies* (2012) 19(4), pp. 505–22.

[8] See Geppert, op. cit. (2), for a deeper analysis of the differences between the 'space person' and the 'space persona'.

[9] Catherine S. Lewis, *Cosmonaut: A Cultural History*, Gainesville: University Press of Florida, 2023.

[10] Andrew L. Jenks, *The Cosmonaut Who Couldn't Stop Smiling: The Life and Legend of Yuri Gagarin*, DeKalb: Northern Illinois University Press, 2012; Trevor Rockwell, 'The molding of the rising generation: Soviet propaganda and the hero-myth of Iurii Gagarin', *Past Imperfect* (2006) 12, pp. 1192–1315. For the use of nostalgia as an organizing imperative in Soviet and Russian space culture see Asif A. Siddiqi, 'From cosmic enthusiasm to nostalgia for the future: a tale of Soviet space culture', in Eva Maurer, Julia Richers, Monica Rüthers and Carmen Scheide (eds.), *Soviet Space Culture: Cosmic Enthusiasm in Socialist Societies*, Basingstoke: Palgrave Macmillan, 2011, pp. 283–306.

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One of the more admirable features of this collection of essays is that the authors move the conversation on space persons (and their space personas) far beyond the typical bipolar concerns of most space historians. Until the early twenty-first century, it was rare to see thoughtful scholarly work that transcended the conventional view of astroculture as a site for Cold War ideological battles waged by Soviet and American actors, or, at best, occasionally including Europeans. In decentering the Space Age, the authors offer a compelling corrective to this orthodox (and tired) view of spaceflight as simply an outcome and manifestation of rivalry between the two superpowers. The narratives in this *Rocket Stars space personas and the global Space Age* special issue traverse a truly global landscape, from Western Europe (the Federal Republic of Germany) to the socialist world (China, the German Democratic Republic) to the postcolonial world (India, Sri Lanka and Cuba). The authors do this without resorting to 'tokenism', not only revealing new spaces of astroculture but also inviting readers to reconsider the encounters, frictions and contestations immanent in the West-centred histories of astroculture. In that sense, the collection offers one structural framework – individual scientific personas and the often transnational networks which they inhabit – to imagine a so-called global Space Age.[11]

The authors here also avoid reductive and static frames to understand their protagonists. As they navigate their way between the life of the person and the construction of the persona, they do not shy away from the deeper complexities of each individual: there is no claim here to suggest that *X* represented *Y*. Instead, what we find are deep fissures, contradictions and instabilities in the shaping of the persona, especially in the early and middle years of the individual when the person's investment in shaping the persona was contested or even challenged by various stakeholders. As Alexander Geppert and Lu Liu show in their masterful essay on the 'celebrification' of Qian Xuesen, now widely celebrated as the 'father' of the Chinese space programme, the making of the 'Qian Xuesen' persona was marked by many paradoxes, including interventions by both state- and private-sponsored narratives and the concomitant tension between Marxist and market-driven imperatives.[12] Such paradoxes, although not always explicitly rendered, are redolent of the construction of all the individuals featured here, including Vikram Sarabhai, long associated with the founding of the Indian space programme. As Haitian Ma shows, his legacy was, for a long time, lodged between the discourse of leapfrogging for national development and the more real-world and some would say cynical discursive apparatus of 'nationalist propaganda of the Indian state'.[13] A kind of cynosure of the Indian space programme already during his lifetime, he became much more in the post-liberalization landscape of India beginning the 1990s. Ma marks his arrival as a celebrity – 'his contemporary re-boom', as she says – to the centenary of Sarabhai's birth in 2019, which coincided with one of the first Indian missions to the Moon.

Ma's work, as well as Tilmann Siebeneichner's essay on German spacefarers Sigmund Jähn and Ulf Merbold and Maritza Gómez Revuelta's offering on the Cuban cosmonaut Arnaldo Tamayo Méndez, suggests that the construction of space personas as vehicles for futurity was also deeply connected to the remaking the past within the context of a national

[11] I elaborate on this issue in Asif A. Siddiqi, 'Into the cosmic (again)', in Siddiqi (ed.), *Cosmic Fragments: Dislocation and Discontent in the Global Space Age*, Pittsburgh: University of Pittsburgh Press, 2025, pp. 3–12.

[12] Alexander C.T. Geppert and Lu Liu, 'The celebrification of Qian Xuesen', *BJHS*, this issue.

[13] Haitian Ma, 'Leapfrogging India: Vikram Sarabhai and the developmental promise of geocentric spaceflight', *BJHS*, this issue. For one of the few biographies that do not take a hagiographical approach to Sarabhai see Amrita Shah, *Vikram Sarabhai: A Life*, New Delhi: Penguin, 2007. For a collection of recollections about Sarabhai see Padmanabh K. Joshi (ed.), *Vikram Sarabhai: The Man and His Vision*, Ahmedabad: Mapin, 1992.

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imagination.[14] The biographies of these leading space persons become at least partly coterminous with the biographies of the nation, punctuated by an often shared rite of passage through some perceived adversity. Here, national and personal trauma were merged into one, and their triumph was at once a triumph of the nation, and vice versa. This was especially true in postcolonial spaces such as India and Cuba, but even so for a European nation fractured and traumatized by war and division, such as the two postwar Germanies, where the lives of the two German spacefarers 'mediated questions of historical place', in Siebeneichner's words. His insightful exploration of the lives and afterlives of Jähn and Merbold provides an original exegesis on the formation of important space personas, showing how contingent they were on their particular national contexts, with 'the celebration of the East German space first clearly focused on its protagonist, [while in the FRG] the techno-scientific object that had paved the way for the FRG's space debut was at the centre of attention'.

Nation and persona also figure in David Skogerboe and David Baneke's exploration of the many afterlives of Arthur C. Clarke, perhaps the foremost space personality of the second half of the twentieth century, at least in the anglophone world.[15] The value of this contribution is that it relocates Clarke's considerable reputation as a 'prophet' of the future very specifically into the context of Sri Lanka, the former British colony where he spent most of his later life. As a futurist, Clarke's reputation is without peer but his relationship with Sri Lanka has a patina of colonial affectation overshadowing it. Skogerboe and Baneke highlight Clarke's occasional 'imperial, paternalistic flavour' when he spoke of politics within Sri Lanka. Clarke's genius was to obscure this paternalism within his seemingly infinite commitment to the power of modern science and technology as transformative agents of social good. This account of Clarke's life suggests, at least implicitly, that Clarke's relationship with Sri Lanka was largely instrumental and rendered only at the level of state and elite power. In that sense, Clarke, like many of the fellow rocket stars profiled here, adopted an affectation of seeming disinterest in his legacy, all the while actually seeking to ensure that it endured, especially in his suggestion that if only Sri Lanka adopted all the cosmic fixes that he had championed – such as satellite communications – development and prosperity would ensue.

Rich with ideas, all of these essays also raise important questions. I offer a few as provocations, grouped under two broad concepts – gender and translation – which might serve as openings for further discussion on the organizing framework of 'rocket stars'. Given that all of the subjects under scrutiny here are men – Geppert speaks of the 'pervasive masculinity' of the 'space patriarchs' – gender undoubtedly casts a long shadow over these discussions. There are, of course, possible candidates for female space persons (and their personas) – Sally Ride, Valentina Tereshkova, and other astronauts and cosmonauts come to mind – but women are noticeably absent when we disaggregate the category of space personalities into those who help produce the conditions for space exploration and those who go there themselves.[16] Of course, this seemingly obdurate distinction has become more fungible with the maturation of the Space Age but it is still worth considering why women

[14] Ma, op. cit. (13); Tilmann Siebeneichner, 'Showcasing Germany in space: the lives and afterlives of Cold War rocket stars Sigmund Jähn and Ulf Merbold', and Gloria Maritza Gómez Revuelta, 'Black in space: Arnaldo Tamayo and the Cuban cosmic revolution', both in *BJHS*, this issue.

[15] David Skogerboe and David Baneke, 'The prophet business: Arthur C. Clarke, Sri Lanka and the making of a global space persona', *BJHS*, this issue.

[16] Geppert, op. cit. (2). There is a large body of literature on women astronauts and cosmonauts, but these works rarely, if ever, address the larger structural gender-based inequalities in the world of space, usually exploring sexist practices limited to the world of astronauts. Their insights thus cannot be generalized to phenomena redolent of larger astroculture. For some important works on female astronauts see Margaret A. Weitekamp, *Right Stuff, Wrong Sex: America's First Women in Space Program*, Baltimore: Johns Hopkins University Press, 2005; Betty Ann Holtzmann

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are generally absent from the first category, the ones who produce 'inflection points' in the history of space – the space persons we identify as introducing important ideas, founding space agencies, creating communities, and essentially altering the trajectory of scientific and technical work. In the construction of space-historical narratives, women appear at the edges of these stories, but they do not produce the conditions for paradigmatic change.

Qian Xuesen, Vikram Sarabhai and Arthur C. Clarke certainly fit this mould, and I would argue that the persistence of men in the pantheon of space personas is a function of the way popular discourses about space travel are still dominated not only by patriarchal and often misogynistic tropes, but also by how we define 'technology' itself as essentially a male domain of activity.[17] The obvious phallic manifestations of rockets notwithstanding, women are essentially marked off in the discursive arena of space activities as essentially passive – their work is legible only to the extent that it is makes 'real' work by men possible. Women can be involved in life-changing decisions in work domains such as maintenance, medical support, social-science work, architecture and management, for example, but these are rarely highlighted in the media in the same breath as more 'glamorous' sites where men are more visible – the launch site, the signing of agreements, the important speech after a success and so on.[18]

How would a feminist reading of the space personas presented here look? Gál and Armstrong identify a number of possible feminist perspectives to the field of outer-space studies, arguing that 'a feminist approach to outer space does not end with demands for representation within the field or an encouragement to hire women into CEO positions at venture-capital-backed space corporations'. Their focus is to uncover 'why certain identities have been a subject of exclusion and oppression within the field'.[19] Drawing on their work, as well as the work of other STS scholars such as Lisa Nakamura, Daniela K. Rosner and others, we can try to reimagine the stories presented here – both of the person and of their constructed personas – as essentially invested in a particular narrative on space that valorizes 'inventors' and 'innovation' over other forms of labour, even and especially when that labour, such as unpaid labour of care, social support, popular advocacy and intellectual exchange – helped produce these personas.[20]

The shaping of Vikram Sarabhai's persona, as a selfless devotee of nation and science, for example, was inextricably dependent on the labour of two women: his 'devoted' wife Mrinalini Sarabhai (1918–2016), a world-famous artist and dancer, who helped produce the narrative of a loyal family man and son of the nation; and his lifelong partner, Kamla Chowdhry (1920–2006), who was probably the most important architect of narrating Sarabhai's early accomplishments, and who curated a certain vision of

Kevles, *Almost Heaven: The Story of Women in Space*, Cambridge, MA: MIT Press, 2006; and Amy E. Foster, *Integrating Women into the Astronaut Corps: Politics and Logistics at NASA, 1972–2004*, Gainesville: University Press of Florida, 2011.

[17] For classic works on the relationship between masculinity and technology see Ruth Oldenziel, *Making Technology Masculine: Men, Women and Modern Machines in America, 1870–1945*, Amsterdam: Amsterdam University Press, 1999; and Roger Horowitz (ed.), *Boys and Their Toys: Masculinity, Technology, and Class in America*, New York: Routledge, 2001.

[18] Note the near invisibility in public discourse of the president and chief operating officer of SpaceX, Gwynne Shotwell, in contrast to the global name recognition of the company's founder, Elon Musk.

[19] Réka Patrícia Gál and Eleanor S. Armstrong, 'Feminist approaches to outer space: engagements with technology, labour, and environment', in Juan Francisco Salazar and Alice Gorman (eds.), *The Routledge Handbook of Social Studies of Outer Space*, London: Routledge, 2023, pp. 158–71, 159.

[20] Lisa Nakamura, 'Indigenous circuits: Navajo women and the racialization of early electronic manufacture', *American Quarterly* (2014) 66(4), pp. 919–41; Daniela K. Rosner, *Critical Fabulations: Reworking the Methods and Margins of Design*, Cambridge, MA: MIT Press, 2020.

Sarabhai – a selfless man committed to the notion of 'science for national development'.[21] In 1974, three years after Sarabhai's death, Chowdhry wrote, in a book of Sarabhai's essays and speeches that she specifically chose and orchestrated for public consumption, that Sarabhai 'often used to say that [he had] a dream, a fantasy maybe, that we can leapfrog our way to development'. Perhaps exaggerating slightly, she added that 'over the years he showed his capacity to leapfrog many decades and to translate many of his dreams to realities'.[22] These small embellishments were crucial, both in shaping Sarabhai's legacy and in foregrounding key terms ('leapfrogging') that, while important, were not necessarily central to Sarabhai's vision while he was alive. These two incredibly accomplished women, whose lives and achievements were quite considerable and independent of those of Sarabhai, are undoubtedly part of the story of both Vikram Sarabhai, the person, and 'Vikram Sarabhai', the persona, and demand thoughtful critical attention, not just to reinstate their roles into the narrative but to help us rethink the multiple meanings of the erasures involved in the creation of 'Vikram Sarabhai', the persona whose career anticipates to some degree the production of 'astro-masculinities' such as Musk, Bezos and their ilk.[23]

A second point I want to raise with regard to the essays is the multiple problems of 'translation' in the production, reification and maintenance of the space persona within astroculture. By translation, I mean the kind of tools, work and strategies required to navigate between different social, discursive and cultural domains. At the very foundational level, all of the individuals profiled in this collection acquired a persona, distinct from their person, within the space advocacy community, but they discarded and then added certain features when they engaged with the broader public, whose only knowledge or awareness of spaceflight was superficial at best, often just a cluster of random referents, clichés and tropes. Translation from the space community to the broader public required, at least tacitly, an acknowledgement that the quasi-religious conviction regarding space travel extant among space advocates was (and is) largely absent among large swaths of the populace. Many space advocates routinely invoke religious imagery, language and precepts to justify their commitment to the cosmos, what Roger Launius has called a kind of 'space gospel'.[24] If the cause of outer space can be considered a belief system not dissimilar to religion, with its own rituals, gods, martyrs and fallen idols, then what happens when one meets unbelievers? When many of these rocket stars cross over to 'secular' spaces where the cause of the cosmos remains unconvincing (and questions about the exorbitant cost are unanswered), one wonders how much *resistance* there is to both the person and the persona. This question remains particularly vexing in the cases of men like Sarabhai, Qian and Tamayo whose personas were inextricably linked to national development, where their every second claim was about space as an instrument for social progress. The essays in this special issue seem to elide this question of resistance and one wonders whether this is because there was none or because the resistance to their personal world views was suppressed or otherwise channelled to less visible avenues.

The passage from domestic to international and back also required translation. Goméz notes in her essay on Arnaldo Tamayo Méndez that the 'persona is transformed through

[21] Nida Najar, 'Mrinalini Sarabhai, Indian classical dancer and choreographer, dies at 97', *New York Times*, 1 February 2016, p. B7; 'Kamla Chowdhry', IIMA Archives, at https://archives.iima.ac.in/faculty/Kamla-Chowdhry.html. For a biography of Sarabhai that delves into the triangular relationship see Shah, op. cit. (13).

[22] Kamla Chowdhry, 'Introduction', in Vikram Sarabhai, *Science Policy and National Development*, Delhi: Macmillan, 1974, xi–xvi, xii.

[23] Gál and Armstrong, op. cit. (19), p. 162.

[24] Roger D. Launius, 'Escaping Earth: human spaceflight as religion', *Astropolitics* (2013) 11(1–2), pp. 45–64, 45. For a broader discussion of the relationship between religion and technology in the Western canon see David F. Noble, *The Religion of Technology: The Divinity of Man and the Spirit of Invention*, New York: Knopf, 1997.

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time and throughout shifting theatres'. Undoubtedly the discursive apparatus at his disposal was also reconstituted, for example, when he crossed from Cuba into the broader socialist and then capitalist worlds, but such transformations also hint at broader shifts in the identity of the rocket star, a form of flexibility that is actually desirable. On his lone space mission Tamayo conducted twenty-seven experiments prepared jointly with Soviet scientists, including studies of Cuban territory and its associated continental shelf to help search for minerals and possible oil deposits and studies of the chemical and biological features of agricultural land. Wilfredo Torres Yribar, the president of the Cuban Academy of Sciences, himself extolled Tamayo's achievements in this scientific domain.[25] Identified as a scientist, an explorer and a pilot, Tamayo also became, after his return, a polemicist on behalf of anti-imperialist causes, noting that 'the development of astronautics by the United States and its allies is aimed at stepping up the arms race, an attitude which has been rejected by every peace-loving nation'.[26] Here, translation was not simply a mode of 'code switching', it was also a form of persona construction, a building block to a larger set of images to be deployed as needed for the future.[27]

As suggested by Goméz, there is also a translation enabled by the passage of time where the space personas have to accommodate substantive and sometimes epochal transitions, such as the end of the Cold War. In his piece on the fortunes of the East German Sigmund Jähn and West German Ulf Merbold, Siebeneichner notes that after the reunification of Germany, 'In stark contrast to the Cold War when spaceflight served as proof of a certain country or ideology being superior to others, it now was presented as an experience that in fact unmasked such perceptions as narrow-minded and obsolete'.[28] While Merbold was able to seamlessly move into a new phase of his career, continuing to fly in space and integrated very much into ongoing European programmes for space research, Jähn, at least initially, found himself adrift, unable to translate his persona to a new era. In time, Jähn's legacy was eventually grafted on to the emergence of *Ostalgie*, a wave of nostalgia for the GDR manifested in all forms of culture, including kitsch and camp. Siebeneichner notes that 'Jähn's persona would become one of *Ostalgia*'s most prominent figureheads'. In other words, Jähn's ability to translate his persona to a new setting, where ideological commitment was less important than a broader fascination with Cold War space exploration as a thing of the past, allowed him to retain and perhaps even elevate his standing as an important figure in Germany's engagement with space.

Once all the space personalities are no longer living, what happens to their legacy? We see in the examples of Clarke, Qian and Sarabhai that their afterlives can be sites for intense negotiation. There's some evidence that as more time passes, the legacy becomes more calcified and fixed, with certain signifiers irrevocably attached to their names – Clarke as a 'prophet of the Space Age', Qian as the 'king of rocketry' and Sarabhai as 'father of the Indian space programme'. Yet one can imagine that these afterlife personas will be as susceptible to change and alteration as those of other historical figures whose message, reputation and principal attachments are hostage to both historical change and academic currents. We can envision, for example, a reassessment of Arthur C. Clarke's legacy through an understanding of one aspect of his personal life – his relationships with men – that has largely been left

[25] Vera Rich, 'Soviet cosmonautics: Cuban went up', *Nature* (16 October 1980) 287, p. 577.

[26] Elsa Blaquier, 'El cosmonauta Tamayo habla sobre el programa espacial con la URSS', *Olivo Verde*, 20 September 1981, pp. 4–6.

[27] For 'code switching' from a sociolinguistics perspective see Kira Hall and Chad Nilep, 'Code-switching, identity, and globalization', in Deborah Tannen, Heidi E. Hamilton and Deborah Schiffrin (eds.), *The Handbook of Discourse Analysis*, 2nd edn, New York: John Wiley, 2015, pp. 597–619.

[28] Siebeneichner, op. cit. (14).

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unexamined but could draw important insights from the theoretical frameworks offered by queer science studies.[29]

One can also imagine a likely path for the reshaping of these personas in the future, resulting from a deeper entanglement with neoliberal political economies, into what I have called elsewhere the 'privatization of memory'.[30] The Soviet and Russian case is instructive. In the Soviet Union, the pantheon of heroes has always included the theorist Konstantin Tsiolkovskii, the so-called chief designer Sergei Korolev and the first cosmonaut Yuri Gagarin, a sort of 'holy trinity' who each achieved immortal status in the both the discursive and material registers of space memorialization, with books, awards, exhibitions, statues and institutions named after them. In post-Soviet Russia today, the three major annual conferences are named after these men and are held regularly, like clockwork, in January (Korolev), April (Gagarin) and September (Tsiolkovskii). Simultaneously, with the collapse of the Soviet Union, their legacies – and that of many other notable figures in Soviet space history – have been 'privatized'; that is, their work and their memory were now bought, sold and traded in a market where certain custodians – such as Korolev's daughter or the Tsiolkovskii Museum – could claim ownership. Of course, the state never fully retreated from battles over the memory of these key individuals, but the entry of private and market forces introduced a pattern of battles pitting important figures, such as Korolev and his erstwhile rival, Valentin Glushko, against each other, decades after their deaths.[31]

In the personas showcased in this special issue, one already sees an encroaching form of 'branding', anticipated by the post-Soviet privatization of space history. In India and China, Sarabhai and Qian represent, respectively, a form of can-do nationalist spirit that is as pliable as it is effective in deployment for all manner of public and private enterprise. Such branding requires an industry ready to commodify and 'sell' scientific personae to the public. A continuing, extremely popular and heavy fictionalized television show in India, *Rocket Boys*, has already brought 'Vikram Sarabhai' the persona to a new media-savvy generation of middle-class Indians hungry for national heroes.[32] One imagines a future of public–private partnerships where many of the rocket stars presented here are presented as pure persona, completely separated from the history of the person, but now sponsored by multinational corporations, selling us Sarabhai Sunscreen, Tamayo Televisions and Qian Chocolate. Such an outcome becomes more and more inevitable as space becomes the playground for our current crop of Silicon Valley billionaires, who see nothing in the cosmos beyond dollars and profits.

[29] Kristina Gupta and David A. Rubin, 'Queer science studies/queer science', in Sharon Crasnow and Kristen Intemann (eds.), *The Routledge Handbook of Feminist Philosophy of Science*, New York: Routledge, 2021, pp. 131–43.

[30] Asif A. Siddiqi, 'Privatising memory: the Soviet space programme through museums and memoirs', in Martin Collins and Douglas Millard (eds.), *Showcasing Space*, London: The Science Museum, 2004, pp. 98–115.

[31] Siddiqi, op. cit. (30).

[32] 'Rocket Boys', at www.imdb.com/title/tt13868972.

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