

Editorial for issue 12.3

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Editorial for issue 12.3: Imagining a Different Past, Present, and Future

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Editorial for issue 12.3: Imagining a Different Past, Present, and Future

What a year it has been! When it is all over, few people will regard 2020 as a bright spot in their memories. We are all tired, many of us are sick, and we are further from each other – literally and metaphorically – than ever. Yet 2020 may also come to be regarded as a turning point, when the fast and slow violence wrought by various forms of inequality finally commanded the attention in mainstream discourse that they deserve.¹ Almost nothing got better this year – but at least this year made it much harder to ignore the conversations that are needed for things to get better in the future.

What role can and should engineering studies play in those conversations? As I noted in the editorial for issue 12.1, engineers and engineering are not neutral actors in this year's crises, but their relationship to those crises is not monolithic or overdetermined either. That editorial was written close to the beginning of the pandemic; the point holds even more now that the pandemic has evolved and aggravated other flash points of contention and confrontation. With respect to Covid-19, at least in some countries countless lives have been (or will be) saved with engineers' help by creating infrastructures for distanced interaction, rapid and large-scale testing and tracing, and developing and manufacturing a vaccine. Particularly with respect to a vaccine, the role of engineers has been disappointingly invisible, in ways that may contribute to public misconceptions about how soon a vaccine will be available. As we know from historical precedent, wonder cures such as penicillin and biotech-based drugs have a very limited – almost zero! – effect until chemical engineers develop ways to scale up their manufacture.²

Yet if engineers receive little of the credit for a vaccine, they also receive less criticism than they merit for the injustices at the center of many of this year's protests. In Hong Kong, Portland, Minsk, and many other cities this year we have seen overly aggressive policing applied to overwhelmingly non-violent demonstrations. Such tactics *can* be carried out with truncheons and lathi sticks, but states increasingly look to engineers to supply new technologies to disrupt the peaceful expression of democratic dissent. Engineers have a choice whether to help develop "active denial systems" (essentially open-air microwave ovens that cause protestors intense pain), chemical irritants, tasers, and other "non-lethal" (really, less-lethal) technologies.³

A more subtle but therefore more intractable issue is that engineers have contributed to the unjust systems that led demonstrators to protest in the first place. I would single out three interrelated sources of this year's discontents that are particularly salient for engineering studies – though I welcome readers to expand this list. First, engineers are deeply implicated in the systems of physical and bureaucratic isolation of groups and communities that facilitate economic, legal, and political inequalities. Walls, cages, maps, prisons,

etc. – these all have to be designed and built by somebody, often someone with engineering expertise.⁴

Too often, these technologies for keeping people isolated are the flip side of technologies for keeping other people connected. The US highway system, for instance, transports millions of people per day from affluent suburban homes to modernist downtown skyscrapers – past the homes and neighborhoods, predominantly of people of color, that were deliberately razed or isolated through the construction of those same roads.⁵ One of the aims of engineering studies, and hence of this journal, is to show that such unjust consequences of engineering work were the result of choice, rather than of a pre-determined technical rationality over which engineers have no control. The highway *could* have looked different, or it could have not been built at all.

Second, engineers and engineering have led the development of systems for separating and polarizing groups culturally and symbolically as well as physically. The history of polarizing communications technologies is hardly new, of course; but in the past twenty years the ways we communicate with each other have increasingly been routed through algorithms that maximize profits by maximizing attention and addiction to the ever more outré and divisive content.⁶ Naturally, highly-engineered technologies of addiction aren't new either.⁷ But the combination of pervasive social media and the algorithmic stimulation of insatiable desire for content that dehumanizes the other is surely a (sad) hallmark of our current moment.

Third, engineers – and especially a certain kind of engineering rationality – are increasingly visible in discourse that seeks to denigrate and undermine democratic dissent and calls for equality. We increasingly hear that prominent Silicon Valley figures have given up on democracy. Noam Cohen nicely surveys this rhetoric and its origins in *The Know-It-Alls*.⁸ The views he examines are sometimes couched as a libertarian rejection of democratically-elected governments' attempts at oversight and taxation of social media companies, or of supposedly censorious efforts to include a more diverse set of voices in the designing of those companies' technologies. At other times, these views are given a more technocratic spin: democratic electorates and their representatives are supposedly unable to understand how technology works and/or are too slow and confused to solve problems rationally. Yet in both versions, engineering rationality allies itself with what William Lynch calls "epistemic authoritarianism" – so it should be no surprise that we see ostensibly libertarian and apolitical engineers making common cause with unabashed authoritarians.⁹

#NotAllEngineers, of course – certainly not! We can't deny that engineering rationality affords views that are anti-democratic and practices that create and exacerbate inequalities. But it would be counterproductive to ignore either the alternative voices among engineers or the unintended consequences of engineering rationality. A good example is the escalating technological to-and-fro between protestors and the authorities all over the world this year. Yes, engineers were involved in the design of electric riot shields – but people with some engineering expertise have also widely circulated instructions for how to disable such shields with simple salt water. Yes, engineers were involved in the design of tear gas and its delivery systems; but we also have engineering expertise to thank for the leaf blowers the protestors used to redirect the gas. The idea that the engineer is a rational and apolitical figure, naturally quietist toward or even supportive of authoritarianism, is itself a political view with a contingent history.¹⁰ The history of engineering offers plenty of exceptions to that rule – exceptions who can serve as inspirations in the present.

So where do we go from here? How do we make 2020 lead to something more of us can rejoice in, rather than a future that almost all of us despair in? Obviously, there is no one way forward nor one correct view on how to get there. But one ingredient will have to be the practiced and critical application of imagination – and it's that ingredient that the articles in this issue of *Engineering Studies* hinge upon. For example, as I hinted at the outset of this editorial, we need some disciplined imagination about how we will look back on this year's events from the future – not simplistic moralizing about the “judgment of history” but perhaps something more akin to Nietzsche's eternal return. How would we imagine reliving our choices from this year over and over and over again, whether in our own and historical memory, or in the ramifying consequences of those choices over time?

More concretely, the articles in this issue prompt us to cultivate our imaginations about the past, present, and future of engineering. We start with the future, with Núria Vallès-Peris and Miquel Domènech's article “Roboticians' Imaginaries of Robots for Care: The Radical Imaginary as a Tool for Ethical Discussion.” As their title indicates, the authors are intensely interested in the imagination as a site of both quietist reproduction of the social order (what they call, citing Cornelius Castoriadis, the “instituted imaginary) and of creativity that disrupts the established order (what Castoriadis terms the “radical imaginary”).¹¹ Vallès-Peris and Domènech also nicely situate their own and Castoriadis' work relative to other studies of imaginaries in science and technology studies, particularly those associated with Sheila Jasanoff and Sang-Hyun Kim's concept of “sociotechnical imaginaries.”¹²

In the Jasanoff and Kim formulation, shared imaginaries map out preferred routes by which society and technology can *co-produce* each other. Vallès-Peris and Domènech's contribution, with the help of Castoriadis, is to show how our imaginaries can either embed a great deal of the present into our technologies and hence to the future social order – or, we can embed in our technologies an imagined future social order that unpicks the inequalities and injustices of the present. The authors make this case using interviews with roboticists who are developing machines for care in future hospitals, nursing homes, and other healthcare contexts. What their interviews show is that roboticists often imagine a future in which robots fit seamlessly into the current productivist political economy of care and its gendered and minoritized division of labor. In contrast, Vallès-Peris and Domènech encourage a form of robotics that draws on the ethics of care and that therefore imagines all care activities as ethically charged; they oppose this understanding to imaginaries of robotics that fragmenting care into an emotional, human component and a mechanical component amenable to substitution by a robot.

Next we have “Investigating Culturally-Contextualized Meaning with the Navajo Nation: Broadening the Normative Making Mentality,” by Daniel Z. Frank, Elliot P. Douglas, Darryl N. Williams, and Carl D. Crane. Here the authors turn our imaginations toward the present by exploring attitudes toward “making” both among the self-appointed apostles of making (e.g., *Make*: magazine) and among members of the Navajo Nation. They show that the imaginary of making promoted by *Make*: and its allies is narrow and exclusionary – only certain kinds of people using certain kinds of technologies (literally) embody that notion of making. Frank and his co-authors critique that notion of making by seeking alternative views within a community that has a widely-traveled reputation for a form of making (“traditional” crafts) that resembles *Make*:s imaginary in some respects but is seemingly less exclusionary and technologically-narrow in other respects.

Yet when Frank and his collaborators asked Diné people about making, their interlocutors imagined making in ways that were often only tangentially related to crafts or the making of things. Instead, the making of people was repeatedly included, and even privileged, within the wider set of making activities. I actually think Frank's Diné interviewees differ from *Make*: and its allies more in their forthrightness than in their understanding of the entanglement of making things and people. *Make*: also wants to make a certain kind of people – neoliberal prosumers – by promoting its imaginary of making things. But the people behind *Make*: are less explicit than Frank's interviewees in investing more meaning in making people than in making things.

As readers, I hope we can be more like both Frank and his study's interlocutors. Like the latter, we should creatively imagine what counts as making, engineering, technology, personhood, etc., rather than fixing uncritically on narrower visions. And like the former, we should be open and inclusive in the cooperative *making* of sites of research. The thematic threads running among Frank and his co-authors, the members of the Navajo Nation that they talked with, and the editors and readership of *Make*: are creatively spun, and lead to unforeseeable critiques of that site's participants' assumptions.

We turn now to "Constructing Containment: Thompson-Starrett, the Çeşme Beach Houses, and the Geopolitics of American Engineering in Cold War Turkey," by Tanfer Emin Tunç and Gökhan Tunç. Here we get a glimpse of past imaginaries of the future and the unanticipated ways in which those futures played out. The imaginaries in question were various forms of "Americanization," as promoted not just by American politicians, businesspeople, and diplomats but also by American engineers *and* by engineers and politicians from America's (erstwhile) Cold War allies.

As the authors show, Americanization was neither imagined nor realized as a one-way process. Turkish politicians of the 1950s, for instance, promoted a vision of Turkey as a "little America" – i.e., they appropriated an imaginary of America as a model for achieving material prosperity and thereby a complacent populace. Businessmen such as Conrad Hilton sought to Americanize Turkey by building American-style hotels and cultivating American-style customs of leisure and travel. But to do so Hilton needed Turkish architects and German contractors; and they, in turn, had to replace American building materials in their designs with ones that were more appropriate to Turkish conditions. And amid it all, the role of the American engineer evolved to include acting as a world-traveling vector of American values and alliance among capitalist nations. "Americanization" changed Americans as much as anyone else.

In addition, Americanization didn't play out the way anyone anticipated. Yes, Turkey and the US remained Cold War allies. But the politicians most associated with turning Turkey into "Little America" abruptly lost power. Giant collaborative projects to literally cement the two countries' friendship became less and less attractive to both sides. And when projects were built, American ideas about maintenance, landscaping, and municipal infrastructure proved difficult to adapt to Turkish conditions over the long-term; building a hotel or resort in an American style is one thing, maintaining it as such is quite another. Tunç and Tunç illustrate this point by looking at a neighborhood of beach houses built in an American style for members of the Turkish elite near the NATO base in Izmir. Today these homes are much-prized relics of a nostalgic past, but for most of their history they have been disappointing and crumbling vestiges of engineers' excessive optimism.

Or perhaps better to say that they were products of engineers' poor imaginations – the homes' builders were simply unable to foresee what would happen once their plans were poured into concrete. The final contribution of this issue, "Assessing the Leadership Competence of Master of Science in Mining Engineering Students," by Bernardo Llamas Moya, Rosa M. Chamorro, Carlos Reparaz, and Pedro Mora explores this point. This Report offers data from a survey in which engineering students in Spain identified their preferred leadership styles. The authors interpret the result as showing that the students gravitated toward rationalistic, relatively uncreative approaches to leadership. Keep in mind that in this journal a Report conveys research results quickly and with less vetting by peers than a regular research article; I see Reports such as this one as a way to expose our readers to studies of engineers and engineering from traditions that we don't normally feature in our regular research articles.

The methods and leadership theories presented in this Report have some currency in, for example, business schools – and this journal should acknowledge that much has been written about engineers and engineering from that tradition. Where that tradition overlaps with the other content of this journal remains to be seen – I think it's an interesting and challenging question to explore. For now, though, the aspect of this Report that I want to highlight relates to imagination and creativity. The authors find a relative lack of imagination among the students they surveyed – or, perhaps, they found that students who stay in engineering quickly learn to discipline their imaginations to conform to engineering rationality. That leads, however, to a counterproductive uniformity among the people who go on to become engineers, as well as to practicing engineers' inability or reluctance to push the bounds of creativity. The answer, the authors argue, is to reform engineering education in a way that encourages a variety of leadership styles, and especially leadership styles that are more imaginative and/or that foster team members' imaginations.


Imagination will only get us so far as we leave 2020 behind, of course. This year's troubles stem in no small part from material inequalities that imagination alone cannot overcome. But cultivating new ways to appreciate the present, anticipate the future, and appropriate the past must be on our agendas – for engineers, engineering studies scholars, and for us all.

Notes

1. Nixon, *Slow Violence and the Environmentalism of the Poor*.
2. Bud, *Penicillin*; Lécuycer and Brock, "High Tech Manufacturing;" Daemmrigh, "Synthesis by Microbes or Chemists?"
3. Eardley-Pryor, "Better to Cry than Die?"; Rappert, *Non-Lethal Weapons as Legitimizing Forces?*
4. Bier, *Mapping Israel, Mapping Palestine*; Lieberman, "The Sociotechnical Imaginaries of Italian and American Prisons;" Slaton, "Making Difference, Making Danger: Engineering Trump's Wall."
5. Shelton, *Power Moves*.
6. Seaver, "Captivating Algorithms."
7. Schull, *Addiction by Design*; Rasmussen, "Jobs Galore for Robots."
8. Cohen, *The Know-It-Alls*.
9. Lynch, *Minority Report*.
10. Smith, *Extracting Accountability*; Barry, "The Anti-Political Economy."
11. Castoriadis, *La Institución Imaginaria de La Sociedad*.
12. Jasanoff and Kim, "Sociotechnical Imaginaries and National Energy Policies."

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