



The Dictator's Dilemma and the "Sovereignty of Cyberspace" Delusion

Hal Berghel , University of Nevada, Las Vegas

The sovereignty of cyberspace is an illusion. So is the dictator's dilemma. But the authoritarian's dilemma is another matter altogether.

Cyberoptimists seem to be on a continuous search for cyberutopias. They are committed to the belief that technology will be able to fix problems that otherwise defy solution. Such beliefs seem to be as natural a part of behavioral modernity in humans as dance, ritual, and the use of tools. Gould and Lewontin refer to such quasi-intellectual evolutionary spinoffs as "biological spandrels."¹

Digital Object Identifier 10.1109/MC.2022.3219928
Date of current version: 9 January 2023

This account is quite creative in combining a useful history of such phenomena while avoiding excessive epistemological baggage. For whatever reasons, there seems to be a human propensity for such Panglossian optimism.

THE DICTATOR'S FALSE DILEMMA

I highlighted one example in an article² about the so-called *dictator's dilemma* popularized by former Secretary of State George Schultz in 1985:

"Totalitarian societies face a dilemma: either they try to stifle these technologies and thereby fall further behind in the new industrial revolution, or else they permit these technologies and see their totalitarian control inevitably eroded."³

By "technologies" Schultz is referring to those that frame the information age and that contribute to the "free flow of information." Schultz claims that "totalitarian states fear this information revolution perhaps even more than they fear Western military strength." The hyperbole camouflages a transparently false dilemma. Tyrants,



dictators, and brutal autocrats have a wide variety of digital tools at their disposal to censor and subdue discussion, such as dehosting websites, protocol blocking, geoblocking, bandwidth shaping, throttling, and so on. Fear is usually sufficient to prevent significant blowback from the public. One only has to consult human rights advocacy groups like Human Rights Watch (www.hrw.org) to develop an appreciation for the widespread global oppression in dictatorial regimes where modern computing, telecommunications, and networking are widely available.

And we must also include so-called *illiberal democracies*⁴ in the mix where some semblance of suffrage is challenged by significant censorship—digital and otherwise. Even two characteristically liberal democracies, the United States and the United Kingdom, both use censorship in matters claimed to be related to their national security, loosely defined. But it must be admitted, tyrants and dictators find censorship simpler and more direct than even illiberal democracies: fear, intimidation, and possibly death are much more effective than sedition laws, official secrets acts, memory and gag laws, and the manipulation of mass media by special interests in both the public and private sectors.^{5,6,7}

Schultz had it completely wrong. Dictators face no such dilemma! The recent political suppression in Iran makes clear^{8,9,10} that the dictator's dilemma is not just a false dilemma but a naive political observation that has never been historically or technologically grounded.

A corollary to Kranzberg's first law¹¹ is appropriate: from the point of view of geopolitics, technology is neither enabling nor obstructing; nor is it irrelevant. The relevance of technology to politics is a mixed bag: important, to be sure, but its consequences are not always predictable, obvious,

or determinant. The reason for this is clear. Technologies do not usually arise from spontaneous, pure intentions. Rather, they are the products of complex motives, mixed intentions, and opaque focus. Once the extent of the lethality of Zyklon B was understood, its use raced beyond delousing, fumigation, and pest control. Chemical and biological weapons, the atomic bomb, land mines, torture devices, and sundry antipersonnel weapons all

this phenomenon was a staple of the action comic books in American life for much of the 20th century, I first took note of it in a cultural anthropology lecture in college. The instructor spoke of a Melanesian and Polynesian concept of *mana*—an invisible life force that could protect and heal—that was as old as their languages. What I found most interesting about the concept of *mana* was the strength of the popular belief in it despite its

From the point of view of geopolitics,
technology is neither enabling nor
obstructing; nor is it irrelevant.

had varied origins and responded to complex interests and intentions. Discussions about them require nuance as their lineages are typically multi-threaded and variegated.

The dictator's dilemma is but one example of the inauspicious augury associated with misplaced confidence in the sanctity of technology—and especially the sovereignty of the Internet. At the risk of appearing presumptuous, we'll subsume the cluster of such beliefs under the label *the sortilege syndrome*. On this account, digital technology is assumed to have powers to right wrongs, save economies, ensure enduring global peace, produce whiter whites without bleach, and cure the common cold. If you think the sortilege syndrome is just plain fantasy, read on. A lot of important, though misguided, people actually believe this stuff.

THE SORTILEGE SYNDROME

The idea of superheroes with superpowers is exceptionally appealing and recurs throughout recorded history. There is just something soothing about offloading the most vexing problems of life to invisible, omniscient, omnipotent forces. While

fundamentally undependable, unpredictable, and nonconfirmable nature.

According to the lecturer, *mana* was considered ubiquitous. It was everywhere at once. However, whether at any given moment in time an individual had it could only be determined after the fact. Thus, if a villager canoed up a river with all of its attendant dangers and returned with food, it was obvious that the villager possessed *mana pro tem*. But if he never returned or was killed en route, the converse was the case. Of course, this led cultures to develop rituals to encourage the spread of *mana* among them. At this point a little enlightenment would have gone a long way, but, then as now, enlightenment was a scarce commodity within the tribe. Were the villagers sufficiently enlightened, they could have observed that not only could *mana* claims never be falsified, they could only be retroactively verified. In other words, they were epistemically vacuous.

In terms of modern science, we would say that *mana* claims had zero predictive, explanatory, and descriptive value. This was my first exposure to what I've subsequently labeled the *elephant bane gambit*.¹² Nobel laureate

Richard Feynman used the phrase "cargo cult science" to describe similar phenomena.¹³ But no matter the label, such limitations didn't disabuse the villagers from their beliefs in mana then, and it doesn't disabuse modern delusional tribalists from their unsubstantiated opinions and beliefs today.

Social scientists have been studying such phenomena for centuries. Of present concern is the way that this has inserted itself into our evaluation of computer and networking technology. I find this even more fascinating than the story of mana. Although the characters have changed, and the supporting rationales seem more erudite, the motives remain the same: a fundamental desire to understand and deal with uncertainty, to justify a willful optimism, and to fit within a satisfying world order, real or imagined. I would be remiss if I failed to point out early on that the prime support does not come from the technology sector but rather from those who read partisan advantage into technology advances whether justified or not. This point will become clearer soon.

TECHNOLOGY IRRATIONALISM AND BLIND FAITH IN COMPUTING TECHNOLOGY

Most of us recognize the sortilege syndrome as it applies to computer and networking systems with stories about the so-called *Twitter Revolutions* in recent years that purportedly demonstrated the relationship between the effectiveness of social activism and the availability of social media and other Internet resources. Many observers have been lulled into the belief that online and networked resources actually made recent social movements like the Twitter Revolution and the Arab Spring possible. Although these beliefs have been largely discredited,^{14,15} they simply won't go away (hence the Iran case mentioned previously). Thus, they're a reasonable object of further study.

An early articulation of a blind faith in computing technology is to be found in John Perry Barlow's 1996 Declaration of the Independence of Cyberspace.^{16,17} Barlow's diatribe included his conviction that "We are creating a world where anyone, anywhere may express his or her beliefs, no matter how singular, without fear of being coerced into silence or conformity." This conviction rings pretty hollow today to the billions of people who live under oppressive regimes. While to some extent social media can have measurable disruptive effects in more democratic societies (for example, QAnon and 4chan), it has never proven to be consistently effective in regime change. While in Western democracies it remains for the most part true that one may represent virtually any views online without fear of state reprisal, it is folly to think that even then such communication goes unmonitored or unpunished. Should these views become bothersome to the prevailing power elite, whether governmental, corporate, or tribal, consequences of some sort are likely to follow. Memory and gag laws are testimony to that fact. See "<ALT>-FAQs."

The reason that Barlow's conviction had currency is that most people seemed caught up in a technology irrationalism that failed to understand technology within the context of existing cultural, political, and economic realities. This failure also ignores the bulk of technology absurdism (development of technology that ignores, fails to appreciate, or underrepresents obvious negative externalities) that we face.¹⁸ As a result, society tends to look at individual examples of absurdist technology as isolated cases, when in fact they are endemic by products of far greater social problems. Consider the following examples:

- › VW's dieselgate program to circumvent U.S. Environmental Protection Agency requirements for NOx emissions¹⁹
- › the Takata airbags failure to address the effect of climate on airbag integrity²⁰

- › the failure of the blowout preventer to work as expected during the BP Deepwater Horizon oil spill because of inadequate training and testing²¹
- › the default insecurity built into the TRENDnet IP Security Cameras²²
- › faulty or incomplete implementations of security technology, such as the Wired Equivalent Privacy protocol in 802.11 Wi-Fi, where the vulnerability was actually built into the Internet Engineering Task Force protocol standard²³
- › the deployment of MiFare radio-frequency identification cards that were easy to reverse-engineer, thus circumventing the encryption security of embedded Crypto-1 cipher²⁴
- › the absence of a robust security model for commercial GPSs that can easily lead to GPS jamming²⁵ and GPS spoofing.²⁶

Let's be very clear about these negative externalities: they were baked into the product development either by design, negligence, or incompetence. The law recognizes responsibilities in such cases under the rubric of the phrase "knew or should have known." Being incompetent, not knowing what you're doing, and being ignorant of applicable laws are not considered adequate excuses for downstream liabilities. In fact, product liability law recognizes that the consumer is entitled some degree of professionalism and care by developers and manufacturers that sell to the public.

Barlow's arrogance betrayed a naivety in believing that Internet innovators, or innovators of any technology for that matter, could define their own political and economic reality. Too many technologists drank that Kool-Aid to the peril of society. The idea that advanced technology could be immune to the forces that create leveraged buyouts, anticompetitive practices, monopolies, technology absurdism, environmental threats, and the like is absurd. We are, all of us, subject to the same social and political exigencies.

<ALT>-FAQs

Since the appearance of my article “A Collapsing Academy IV: How Did Memory and Gag Laws Gain Admission?” (*Computer*, September 2022), several additional state statutes have been reported. A partial update follows:

1. The Florida “Stop WOKE Act”^{S1,S2} amended Florida’s Individual Freedom Law, which was passed by the Florida Legislature on 10 March 2022 and signed into law by Florida Governor DeSantis. This act attempts to ensure that state employees stay on the same partisan page as the state’s political leadership. This Stop WOKE Act restricts education in eight areas. As such, it is very similar in wording to other legislation covered in my article. However, there are some noteworthy additions. First, it threatens funding cuts to institutions that don’t punish faculty who fail to follow the official, state-endorsed indoctrination regimen. Second, the Act follows a current trend of similar legislation in changing key class identifiers from “ethnicity” to “color” and “gender” to “sex.” Such subtleties are related to a movement to redefine the notion of protected classes in federal and state laws.
For example, gender identity is included as a protected class under Executive Order (EO) 13672 (2014). It does not fall within Title VII of the Civil Rights Act of 1964 or any other federal law establishing protected status. The subtle shift in language in current legislation is responsive to three circumstances: 1) the strong opposition to EO 13672 by those who favor selective discrimination, 2) the pending Supreme Court case *Equal Employment Opportunity Commission v. R.G. & G.R. Harris Funeral Homes*,^{S3} which seeks to determine in part whether the word “sex” in Title VII’s prohibition on discrimination includes attributes that use the term “gender”—such as “gender identity” and “transgender,” and 3) the latitude some red states (including Florida) will have in reframing gender identity document laws^{S4} and circumscribing state nondiscrimination laws^{S5} regarding LGBTQ communities.
2. The Florida Board of Trustees fired the University of Florida’s director of the honors program apparently without the endorsement of the University of Florida president. It has been suggested that the termination was the result of the design of gender-neutral bathrooms in the new honors program dormitory under construction and the director’s support of “holistic admissions practices.”^{S6,S7} In any event, the insertion of a governance board into university administration management is very unusual and, together with other changes in Florida law, likely

foretells continued constraints on academic independence in Florida institutions of higher education.

3. The Florida Board of Governors approved the appointment of a Florida state senator and ally of governor Ron DeSantis as system chancellor despite his lack of higher education experience.^{S8} Two finalists, a state senator and director of interagency partnerships at Florida Gulf Coast University, and the chief business officer of Emory University’s Candler School of Theology, were selected from a pool of eight candidates.^{S9} Republican politician Senator Ben Sasse (R, NE) is the sole finalist for the presidency of the University of Florida at this writing, having been selected by the search committee in September 2022.^{S10} Presidential searches are exempt from open meeting requirements by Florida law, so no details on the search process or candidate pool are publicly available.
4. The administration of the University of Arizona has blocked three faculty candidates from competing for election to the university faculty senate committee on academic freedom and tenure, having identified them as “problem faculty” because of their prior criticisms of the institution, including the purchase of financially strapped, for-profit, Ashford University amidst lawsuits and accreditation issues.^{S11,S12}
5. The University of Idaho limits what employees can say about abortion. The university’s general counsel informed employees that, under Idaho Statute Title 18, Chapter 87, Section 18-8705,^{S13} any discussion that could be interpreted to “... promote abortion [or] counsel in favor of abortion...” would be illegal and subject employees, specifically including instructors, to prosecution.^{S14}

REFERENCES

- S1. “CS/HB 7: Individual Freedom,” Florida House of Representatives (companion bill SB 2524). Accessed: Oct. 12, 2022. [Online]. Available: <https://www.flsenate.gov/Session/Bill/2022/0007/ByVersion>
- S2. “LAWSUIT: FIRE challenges Stop Woke Act’s limits on how Florida professors can teach about race, sex,” FIRE, Philadelphia, PA, USA, Sep. 6, 2022. [Online]. Available: <https://www.thefire.org/lawsuit-fire-challenges-stop-woke-acts-limits-on-how-florida-professors-can-teach-about-race-sex/>
- S3. *EEOC v. R.G. & G.R. Harris Funeral Homes*, Petitioner v. Equal Opportunity Employment Commission, respondent, and Aimee Stephens, Respondent-Intervenor, On Petition for a Writ of Certiorari to the United States

(Continued)

<ALT>-FAQs (Continued)

- Court of Appeals for the Sixth Circuit. Accessed: Oct. 12, 2022. [Online]. Available: https://www.aclu.org/sites/default/files/field_document/petition_for_writ_of_certiorari.pdf
- S4. "Identity document laws and policies, new democracy maps," Movement Advancement Project, Boulder, CO, USA. Accessed: Oct. 12, 2022. [Online]. Available: https://www.lgbtmap.org/equality-maps/identity_document_laws
- S5. "Nondiscrimination laws, new democracy maps," Movement Advancement Project, Boulder, CO, USA. Accessed: Oct. 12, 2022. [Online]. Available: https://www.lgbtmap.org/equality-maps/non_discrimination_laws
- S6. C. Flaherty, "Allegations of Board Overreach: Why did the University of Florida suddenly fire its honors program director?" *Inside Higher Ed*, Aug. 16, 2022. [Online]. Available: <https://www.insidehighered.com/news/2022/08/16/why-did-u-florida-suddenly-fire-its-honors-director>
- S7. C. Casale, "UF Board of Trustees fires longtime honors program director allegedly with no reasoning," *The Independent Florida Alligator*, Gainesville, FL, USA, Aug. 15, 2022. [Online]. Available: <https://www.alligator.org/article/2022/08/uf-honors-program-director-fired>
- S8. J. Moody, "Fla. system chancellor search mired in politics," *Inside Higher Ed*, Sep. 23, 2022. [Online]. Available: https://www.insidehighered.com/news/2022/09/23/florida-chancellor-search-yielded-only-eight-applicants?utm_source=Inside+Higher+Ed&utm_campaign=2a7d1ea35b-DNU_2021_COPY_02&utm_medium=email&utm_term=0_1fcbc04421-2a7d1ea35b-237017285&mc_cid=2a7d1ea35b&mc_eid=82ecb9e597
- S9. C. DeLisa, "Sen. Ray Rodrigues recommended to take up state university chancellor position," *The Capitolist*, Aug. 29, 2022. Accessed: Oct. 12, 2022. [Online]. Available: <https://thecapitolist.com/sen-ray-rodrigues-recommended-to-take-up-state-university-chancellor-position/>
- S10. M. Nietzel, "Senator Ben Sasse likely to become President of the University of Florida," *Forbes*, Oct. 6, 2022. [Online]. Available: <https://www.forbes.com/sites/michaelt Nietzel/2022/10/06/senator-ben-sasse-likely-to-become-next-president-of-the-university-of-florida/?sh=31e521a87472>
- S11. C. Flaherty, "Blackballed at Arizona?" *Inside Higher Ed*, Sep. 29, 2022. [Online]. Available: https://www.insidehighered.com/news/2022/09/29/u-arizona-professors-say-theyre-blackballed-service?utm_source=Inside+Higher+Ed&utm_campaign=bdf3a450b4-DNU_2021_COPY_02&utm_medium=email&utm_term=0_1fcbc04421-bdf3a450b4-237017285&mc_cid=bdf3a450b4&mc_eid=82ecb9e597
- S12. M. Vasquez, "Inside the scramble to save Ashford U.: How political maneuvering kept GI Bill funds flowing to a for-profit university," *The Chronicle Higher Educ.*, Nov. 10, 2017. [Online]. Available: <https://www.chronicle.com/article/inside-the-scramble-to-save-ashford-u/>
- S13. Idaho Statute Title 18, Chapter 87, Section 18-8705, 2021. [Online]. Available: <https://legislature.idaho.gov/statutesrules/idstat/Title18/T18CH87/SECT18-8705/>
- S14. C. Flaherty, "University tells professors to stay 'Neutral' on abortion," *Inside Higher Ed*, Sep. 27, 2022. [Online]. Available: <https://www.insidehighered.com/news/2022/09/27/university-tells-professors-stay-neutral-abortion>

The false dictator's dilemma, the Twitter Revolution, the effectiveness of social media on the Arab Spring revolution, Barlow's naive optimism, and so on have all taken on lives of their own in political mythology despite the absence of empirical validation. Their currency and latency are products of the fact that they comport well with a partisan political narrative that buttresses a very narrow global world view—not that there is any evidence to support these claims. These myths should

be eagerly cast aside with immense scholarly satisfaction. ■

REFERENCES

1. S. J. Gould and R. C. Lewontin, "The spandrels of San Marco and the Panglossian paradigm: A critique of the adaptationist programme," *Proc. Roy Soc. B*, vol. 205, no. 1161, pp. 581-598, 1979, doi: 10.1098/rspb.1979.0086.
2. H. Berghel, "The dictator's (false) dilemma," *Computer*, vol. 49, no. 7, pp. 84-87, Jul. 2016. [Online]. Available: [https://ieeexplore.ieee.org/stamp/](https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=7503517)
3. G. Schultz, "New realities and new ways of thinking," *Foreign Affairs*, vol. 63, no. 4, pp. 705-721, 1985. [Online]. Available: https://www.jstor.org/stable/pdf/20042281.pdf?refreqid=excelsior%3Ae169d4f53184f03f5f08bdf432379493&ab_segments=&origin=&acceptTC=1
4. "The journal of illiberalism studies, illiberalism studies program." George Washington University Institute for European, Russian

- and Eurasian Studies. Accessed: Sep. 20, 2022. [Online]. Available: <https://www.illiberalism.org/the-journal-of-illiberalism-studies/>
5. H. Berghel, "A collapsing academy IV: How did memory and gag laws gain admission?" *Computer*, vol. 55, no. 9, pp. 107–114, Sep. 2022, doi: 10.1109/MC.2022.3187809. [Online]. Available: <https://ieeexplore.ieee.org/document/9869580>
 6. E. S. Herman and N. Chomsky, *Manufacturing Consent*. Reprint. New York, NY, USA: Pantheon, 2002.
 7. P. Bennett and M. Naim, "21st-century censorship: Governments around the world are using stealthy strategies to manipulate the media," *Columbia Journalism Rev.*, Jan./Feb. 2015. [Online]. Available: https://archives.cjr.org/cover_story/21st_century_censorship.php
 8. C. Thorbecke. "Iran's sweeping internet blackouts are a cause for concern." CNN Business. Accessed: Sep. 20, 2022. [Online]. Available: <https://www.cnn.com/2022/09/24/tech/iran-internet-blackout/index.html>
 9. W. Strzyżńska, and Agencies, "Iran blocks capital's internet access as Amini protests grow," *The Guardian*, Sep. 22, 2022. [Online]. Available: <https://www.theguardian.com/world/2022/sep/22/iran-blocks-capitals-internet-access-as-amini-protests-grow>
 10. S. Ray, "Iran blocks nearly all internet access as anti-government protests intensify," *Forbes*, Sep. 22, 2022. [Online]. Available: <https://www.forbes.com/sites/siladityaray/2022/09/22/iran-blocks-nearly-all-internet-access-as-anti-government-protests-intensify/?sh=5ccf9b613496>
 11. M. Kranzberg, "Technology and history: Kranzberg's Laws," *Technol. Culture*, vol. 27, no. 3, pp. 544–560, 1986, doi: 10.2307/3105385. [Online]. Available: <https://www.jstor.org/stable/pdf/3105385.pdf>
 12. H. Berghel, "Secretocracy," *Computer*, vol. 49, no. 2, pp. 63–67, Feb. 2016, doi: 10.1109/MC.2016.61. [Online]. Available: <https://ieeexplore.ieee.org/document/7404208>
 13. R. Feynman, "Cargo cult science," California Inst. Technol., Pasadena, CA, USA, Jun. 1974. [Online]. Available: <https://calteches.library.caltech.edu/51/2/CargoCult.pdf>
 14. E. Morozov, *The Net Delusion: The Dark Side of Internet Freedom*. New York, NY, USA: PublicAffairs, 2011.
 15. E. Morozov, *To Save Everything, Click Here: The Folly of Technological Solutionism*. New York, NY, USA: PublicAffairs, 2013.
 16. J. P. Barlow, "A declaration of the independence of cyberspace," Electronic Frontier Foundation, San Francisco, CA, USA, 1996. [Online]. Available: <https://www.eff.org/cyberspace-independence>
 17. J. P. Barlow, "Is cyberspace still anti-sovereign?" Cal Alumni Association, Berkeley, CA, USA, Reprint, Feb. 12, 2018. [Online]. Available: <https://alumni.berkeley.edu/california-magazine/march-april-2006-can-we-know-everything/jp-barlow-cyberspace-still-anti>
 18. H. Berghel, "Technology abuse and the velocity of innovation," *Cutter IT J.*, vol. 28, no. 7, pp. 12–17, 2015. [Online]. Available: <https://www.cutter.com/article/technology-abuse-and-velocity-innovation-487516>
 19. R. Hotten, "Volkswagen: The scandal explained," *BBC News*, Dec. 10, 2015. [Online]. Available: <https://www.bbc.com/news/business-34324772>
 20. "Takata airbag recall: Everything you need to know," *Consumer Rep.*, Sep. 21, 2021. [Online]. Available: <https://www.consumerreports.org/car-recalls-defects/takata-airbag-recall-everything-you-need-to-know-a1060713669/>
 21. "Deepwater Horizon blowout preventer failure analysis report to the U. S. Chemical Safety and Hazard Investigation Board," U. S. Chemical Safety and Hazard Investigation Board, Washington, DC, USA, Jun., 2014. [Online]. Available: https://www.csb.gov/assets/1/20/appendix_2_a_deepwater_horizon_blowout_preventer_failure_analysis1.pdf?15262
 22. M. Smith, "Backdoor in TRENDDnet IP cameras provide real-time peeping tom paradise?" *CSO Online*, Feb. 7, 2012. [Online]. Available: <https://www.csoonline.com/article/2221645/backdoor-in-trendnet-ip-cameras-provide-real-time-peeping-tom-paradise-.html>
 23. H. Berghel and J. Uecker, "Wireless infidelity II: Airjacking," *Commun. ACM*, vol. 47, no. 12, pp. 15–20, 2004, doi: 10.1145/1035134.1035149.
 24. K. Nohl and H. Plotz, "Mifare: Little security, despite obscurity," in *Proc. 24th Chaos Commun. Congr. (24C3-1.01)*, Dec. 28, 2007. [Online]. Available: <https://fahrplan.events.ccc.de/congress/2007/Fahrplan/events/2378.en.htm> (presentation); <http://www.proxmark.org/files/Documents/13.56%20MHz%20-%20MIFARE%20Classic/Cryptanalysis.of.Crypto-1.pdf> (report)
 25. J. J. A. Bhatti, T. E. Humphreys, and B. M. Ledvina, "Development and demonstration of a TDOA-based GNSS interference signal localization system," in *Proc. 2012 IEEE/ION Position, Location Navig. Symp.*, pp. 455–469, doi: 10.1109/PLANS.2012.6236915.
 26. M. Psiaki and T. Humphreys, "Civilian GNSS spoofing, detection, and recovery," in *Position, Navigation, and Timing Technologies in the 21st Century: Integrated Satellite Navigation, Sensor Systems, and Civil Applications*, Y. T. Jade Morton, F. v. Diggelen, J. J. Spilker Jr., B. W. Parkinson, S. Lo, and G. Gao, Eds. Piscataway, NJ, USA: IEEE Press, 2021, pp. 655–680. [Online]. Available: <https://ieeexplore.ieee.org/servlet/opac?bknumber=9304973>

HAL BERGHEL is a Fellow of IEEE and ACM and a professor of computer science at the University of Nevada, Las Vegas, NV 89154 USA. Contact him at h1b@computer.org.