

Here We Go Again: On the Biological

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Abstract

In this short essay, Herzig and Subramaniam explore the potent role of “biological” sex/gender in contemporary politics. Considering some of the social movements, legislative actions, and affective investments mobilized around concepts of the biological, the essay first names some of feminist science and technology studies’ (FSTS) core contributions to understandings of biological sex/gender, then discusses how the field might be better positioned to intervene in future debates.

Keywords

sex/gender, biology, biological classification, science, biopolitics

“Sex” shall refer to an individual’s immutable biological classification as either male or female. “Sex” is not a synonym for and does not include the concept of “gender identity” ... “Gender ideology” ... permit[s] the false claim that males can identify as and thus become women and vice versa, and requir[es] all institutions of society to regard this false claim as true.

—President Donald Trump, The [United States] White House, “Defending Women from Gender Ideology Extremism and Restoring Biological Truth to the Federal Government” (January 20, 2025)

Far from immutable, the biological is scarcely a hundred years old.

The *Oxford English Dictionary* suggests that the word *biological* first made its appearance in 1822, in a volume of the now-long-defunct British periodical *The Eclectic Review*, in a reference to the “catastrophe” of bodily death and decay (“Lawrence and Pring” 1822, 492). Its clout grew swiftly, as the management and regulation of life itself moved to the center of biopolitical techniques of governance. Over the nineteenth century, ethnologists used the *biological* to argue for the legitimacy of racial slavery and imperial expansion (Hunt 1863, 18), psychologists used *biological* to argue against co-educating the sexes (Hall 1904, 561), and political philosophers used *biological* to argue against liberal democratic rule (W. Lewis 1926). Classifications of male and female were inseparable from such practical applications, and already by 1914, “authoritative,” “prominent” biologists were being summoned by the US popular press to defend a binary, two-sex model against incursion from the “biological bosh” of “feminist propaganda” (MacAdam 1914, 50).

We have, in other words, been here before.

A century before the second Trump administration’s insistence on binary, dimorphic biological sex differences, we can find the familiar contours of debate in US popular cultures: science vs. ideology, nature vs. social construction, sex vs. gender. As readers of *Catalyst* are well aware, the United States is not exceptional in this regard: Assertions of immutable, biological sex—along with deterministic claims about related social and political obligations—have been on rise globally. Across a range of geographical locations, resurgent nationalisms have mobilized in opposition to “gender ideology,” including attacks on queer and trans individuals and communities, on gender studies as an academic field, and on access to policies and norms associated with movements toward gender equity (Associated Press in Moscow 2023; Holvikivi et al. 2024; Kent and Tapfumaneyi 2018; Kuhar and Paternotte 2017).

As we seek to understand this resurgent legislative and affective investment in biological binaries, what might a generation of scholarship in feminist science and

technology studies (FSTS) bring to the table? What have practitioners in our field learned, or failed to learn, over the years?

As co-editors of the decade-old FSTS book series *Feminist Technosciences* (University of Washington Press), and as scholars located within the rapidly shifting landscape of US higher education, we've been stewing on those two questions a fair amount. Here, we first summarize what we see as three salient contributions of FSTS to grappling with recent efforts to replace "gender ideology extremism" with "biological truth." As we enumerate these contributions, we are keen to avoid recurrent feminist narrative tropes of scholarly progress, loss, or return (Hemmings 2011); each of the contributions, we recognize, is likely already self-evident to readers of this journal. (We all have been here before!) Nonetheless, we see value in reiterating these contributions now—if, for no other reason, than to stack a few sandbags against the flood of fresh claims about "biological sex," including but not limited to the rising waters in our respective backyards (Bates 2025; Pendharkar 2025). After summarizing those three contributions, we flag two areas that we believe merit further consideration by FSTS scholars, particularly in the face of the increasingly authoritarian social movements unfolding today.

Three Lasting FSTS Contributions

Among the contributions that an FSTS perspective might bring to contemporary claims about "immutable biological classifications," is, first, and perhaps most simply, that "biology" is not the body.

A rich, heterogeneous scholarly literature in feminist and queer STS demonstrates, as Donna Haraway puts it, that biology is, literally, a *logos* about *bios*—knowledge about life, not life itself (Penley et al. 1990, 11). Generations of feminist studies emphasize the complex, varied, intra-active agencies of material phenomena—complexity and nuance erased in caricatures of feminism's "matter-phobic" aversions to biological truth (Ahmed 2008, 34). FSTS, as we understand it, traffics in consideration of the material-semiotic and natural-cultural, without resorting to table-thumping claims about the pre-discursively Real.

Second, research in FSTS has shown that contests over the "immutable biological classification" of sex/gender are always also contests about race, species, ability, age, and other power-laden classifications of difference. While the January 2025 executive order quoted in the epigraph focuses solely on definitions of "female" and "male" (meaning, respectively, "a person belonging, at conception, to the sex that produces the large reproductive cell" or "a person belonging, at conception, to the sex that produces the small reproductive cell"), decades of scholarship in FSTS show that such *scalar* anatomical assessments (large cells vs. small cells, large pelves vs. small pelves, large brains vs. small brains)—themselves a bewildering way to cement "binary" sex—are threaded through with racial, ethnic,

and colonial bias (Fausto-Sterling 1993; Gere 1999; Markowitz 2001; Stein 2015). FSTS's highly generative engagements with animal studies further shows how such racialized, settler sex/gender distinctions materialize assumptions about species, and the presumed centrality of the category of the human (Birke et al. 2004; Birke et al. 2004; Herzig and Subramaniam 2017).

Third, research in FSTS has demonstrated the generosity and generativity of close collaborations with practitioners: scientists, clinicians, engineers, healers, midwives, primary and secondary school teachers, community activists, and more. A long history of wars over epistemic authority, evident already in the aforementioned 1914 positioning of "authoritative biology" against "feminist propaganda," reveals how easily feminist criticism of heteropatriarchal biological determinism can be conflated, wrongly, with wholesale rejection of science. A number of founding FSTS scholars—Ruth Bleier, Anne Fausto-Sterling, Evelyn Fox Keller, Evelyn Hammonds, Ruth Hubbard, Donna Haraway, Sue Rosser, Bonnie Spanier—were formally trained in the natural sciences, and remain(ed) committed throughout their careers to building better scientific knowledges and practices. The list of FSTS scholars committed to improving "science" has only grown longer and more diverse across disciplines, social identities, and geographical locations. Recent books—including Ambika Kamath and Melina Packer's *Feminism in the Wild: How Human Biases Shape Our Understanding of Animal Behavior* (2025); Chanda Prescod-Weinstein's *The Disordered Cosmos: A Journey into Dark Matter, Spacetime, and Dreams Deferred* (2021); Deboleena Roy's *Molecular Feminisms: Biology, Becomings, and Life in the Lab* (2018)—display the thorough and simultaneous embrace of scientific and feminist analyses. A wide range of contemporary researchers now carry feminist and queer perspectives as part of their standard observational toolkits, as evidenced by the special section of *American Naturalist* on "Nature, Data, Power" (Kamath et al. 2022), or the introduction to the special issue of *Integrative and Comparative Biology* on sexual diversity and variation (Lewis and Sharpe 2023). We take from this work that the legacies and impacts of FSTS perspectives have made inroads into transforming academic, governmental, and community-based scientific and technical projects. Indeed, one of the core strengths of FSTS, in our view, is the field's capaciousness and porosity: a multi-sited, interdisciplinary, canon-resistant reckoning with conjunctures of power and knowledge.

Two Areas for Further FSTS Attention

Yet for all that porosity, we do seem to find ourselves in familiar patterns, encountering normative beliefs about "immutable" sex differences again and again. As contemporary calls to restore "biological truth" with respect to binary sex repeat, wholesale, discursive frames from a century ago, we find ourselves wondering, *Why?* Why such persistent return to assertions about binary biological sex? Why haven't varied scientific studies disproving strict sex dimorphism in humans—over and above the myriad historical, anthropological, sociological, and

philosophical studies challenging the immutability of binary sex—failed to slow recent legislative and cultural investment in defending oversimplified visions of the biological (Rehmann-Sutter et al. 2023; Richardson 2022)? Reflecting on this question, we arrive at two observations, which we believe FSTS might fruitfully consider further.

First, we believe it is imperative to recognize that the persistence of debates about the “biological” indicates persistent struggle over the status of women, including but not limited to their status within power-laden STEM fields. Despite decades of resources poured into “women in science” initiatives, the proverbial “leaky” pipeline leaks on. In South Korea, for instance, the percentage of women in STEM fields is under 23 percent—the lowest among OECD member countries (Hong 2025). Researchers further observe that “provision of information regarding the degree to which gender disparities exist in Korea does little to bridge” a wide, and still expanding, gender and generational divide in attitudes toward gender equity (Mo and You 2025). In Germany, where the number of women pursuing STEM fields impressively doubled from 2008 to 2022 according to the federal statistical office (to comprise 35.1 percent of all students in STEM subjects), researchers continue to find gendered inequities across STEM disciplines, including stereotypical beliefs and unequal workloads (Kube et al. 2024; Wolbert 2025). Trump’s January 2025 executive order is, obviously, just one node in an international anti-gender movement (ILGA Europe 2025; Mulucha 2022)—seeking to position women, femmes, and LGBTQ+ people, beyond those in STEM fields, in positions of social, political, and economic subordination. The strident assertion of “immutable” biological classifications is about heteropatriarchal domination. Academic feminists ignore this at our peril.

It can be startling just how overt and unabashed those calls for heteropatriarchal domination can be. Advocates for masculinist Christian nationalism in the US now openly discourage women from pursuing higher education, and instead urge accommodation with “feminine goals of home making.” Political scientist Scott Yenor, speaking at a recent national conference, denounced US colleges and universities as “the citadels of our gynecocracy,” delaying women’s childbearing in support of their career ambitions. As Yenor put it, “Every effort must be made not to recruit women into engineering, but rather to recruit and demand more of men who become engineers. Ditto for med school and the law and every trade” (quoted in Jackson 2021). Again, the US is hardly alone in this regard: In Hungary, for instance, concerns about women in higher education are routinely framed in terms of effects on heterosexual marriage and reproductivity (*BBC News* 2022). In Germany, a focus on unwinding women’s education and employment is tied to efforts to naturalize a sex/gender binary, and to cement the white nuclear family as the foundation of the nation (Holzberg 2024).

We take from these unabashed calls to limit women's participation in public spheres the strong, clear need for ongoing coalition building between FSTS and practitioners of "normal" science. Just as early practitioners of feminist science studies drew on their experiences as scientific researchers, we hope that more theory-heavy branches of FSTS will maintain and even strengthen connections to scholars focused squarely on issues of inclusion and advancement of women, LGBTQ+, BIPOC, and other minoritized practitioners in STEM. These connections include projects of scientific knowledge-making ongoing *within* FSTS (Giordano 2017; Hazard 2022; Kamat et al. 2022; Lasker and Simcox 2020; Pico 2023; Riley 2022).

Second, we believe it is imperative that FSTS recognize the ineradicable intersections between science and religion in the politics of sex, gender, and sexuality. Debates about the biological—about "life itself"—evoke, implicitly or explicitly, not only the status of males, females, and nonhuman animals, but also kinship and connectedness with the more-than-human. Decolonial approaches to scientific knowledge—which upend the very separability of scientific subjects and objects—suggest multiple paths for deeper reflection (Kimmerer 2013; Prescod-Weinstein 2015; TallBear 2013). Yet to date, even decolonial FSTS has not significantly disrupted the presumptive secularity of FSTS or other academic fields.

As a result, as feminist scholars, we find ourselves in a difficult position when presented with developments such as the Alabama Supreme Court's landmark 2024 ruling that frozen embryos are to be legally treated as "unborn children located outside of a biological uterus" (*LePage vs. Center for Reproductive Medicine* 2024). Although Alabama lawmakers subsequently passed a measure to protect providers in the state from civil or criminal liability for embryo loss (Talukder 2024), the court's ruling remains in place. And in that ruling, definitions of the "biological" are overtly scriptural: "We believe that each human, being from the moment of conception, is made in the image of God, created by Him to reflect His likeness. It is as if the People of Alabama took what was spoken of the prophet Jeremiah, and applied it to every unborn person in the state" (48). The chief justice continues, "Carving out an exception for the people in this case, small as they were, would be unacceptable to the People of this State, who have required us to treat every human being in accordance with the fear of a holy God, who made them in His image" (48). Arguments marshaled against embryonic personhood may wish, understandably, to reject such judicial "fear of a holy God," and instead elevate a vision of secular reason, grounded in the "medical and scientific consensus" that "embryos are cells capable of creating life rather than consisting of actual life" (Chesak 2024). Yet universal consensus about "actual life" is fictive. The biological, no less than the scriptural, is a situated, contingent form of knowledge.

To the extent that Western academic feminists' claims to epistemic authority (our own as well as others) often rely on an alleged freedom from faith, we find

ourselves ill-prepared to engage knowledge claims based on other ideological frames (Connolly 2000), such as the invocation of the prophecies of Jeremiah presented by the Alabama Supreme Court, or, for that matter, the anti-colonial forms of knowledge-making presented by Indigenous feminisms. We instead find ourselves asked to join hands with calls to “Believe Science” or “Trust Science”—slogans that, of course, erode the very status of “science” as a practice grounded in something *other* than belief or prophecy. Unreflexive insistence that we “Trust Science” serve those most vulnerable to scientific and medical harm insufficiently or not at all, and will prove of little comfort if minoritized researchers are driven back out of the scientific professions altogether.

We thus find ourselves actively longing for scholarship in FSTS that directly engages entanglements of scientific and religious ways of knowing. We think here not only of timely critiques of settler science’s false promises of secular objectivity (e.g., TallBear 2013, 2017, 2019), but also the wide array of efforts to document how belief in the more-than-human shapes contemporary scientific practice, whether in ethnobotany (e.g., Foster 2017; Makunga et al. 2008; Roberts 2012); reproductive medicine (e.g., Pande 2009; Thomas 2021); computing and robotics (e.g., Bhattarai 2017; Haraway 1987; or studies of animal behavior (Gillis-Buck 2016; Weaver 2021; Willey 2016). As ever, the vast, generative world of feminist science fiction and speculative fiction, from icons such as Octavia Butler and Ursula LeGuin to more recent world-making fabulists (Earle 2019; Kenney 2019), also offers fruitful sites for thinking-otherwise.

We see in such work the early signs of *post-secular* situated knowledges, approaches that historicize and contextualize connections and disconnections between apparently incommensurate cosmologies of the “biological.” Rather than foreclosing moments of incommensurability in discursive processes of sacralization and desacralization, we hope FSTS might stay with the political and epistemological trouble generated by the profound gaps between, say, contemporary peer-reviewed biological research, which presumes a separation between scientific subjects and their objects of study, and ways of knowing that instead consider “grammars of animacy” as relational processes of becoming (Kimmerer 2013). Recognition of the *metaphysical* complexities of “life itself” strikes us as essential to responding to scriptural and/or scientific arguments for hierarchical domination.

For Which Science We Are Marching

Staying with the epistemological trouble, rather than adopting strategic biological essentialisms, obviously carries political risk. We have been here before. And yet, we see these moments as critical for FSTS—as a frame for more expansive *logos* about *bios*. We seek to promote an FSTS that engages not only issues of epistemic objectivity, credibility, and authority, but also issues of funding, regulation, mentoring, animal care, land return, and so on and on. As

Amy Slaton (2018) has written, “we need to insist now on wider terms of debate regarding our thinking about nature than simply whether that thinking is ‘evidence-based’ or not—these are terms that the right has set for us...foreclos[ing] deep reflection about power and knowledge.” While “Marching for Science,” Slaton reminds us, “we need to be clear for which Science we are marching”—one which remains committed to unwinding misogyny, white supremacy, anthropocentrism, and allied oppressions. Again, we have been here before (Co*Lab, 2022;Liboiron et al. 2018). We join those who remain *for* a science of planetary emancipation—a science worthy of FSTS.

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