

## **Science as Performance**

Jenny Lorraine Nielsen

Department of Philosophy; Integrated Arts Research Initiative at the Spencer Museum of Art,

University of Kansas

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Although scientists *perform* some variation of the “scientific method” (Hepburn and Andersen 2021, italics mine) and “*perform... experiments in order to decide what is true*” (e.g., Colombo, Potochnik and Wright 2018, 20, italics mine), a study of science *as performance* has gained little traction in critical discussions. The practice of science is presented as mostly cognitive and abstracted—an exercise in passive data gathering followed by an intellectualized arrangement and representation of facts. According to sociologist Andrew Pickering, gathered knowledge, rather than performance and agency, is taken as the “given point of departure” in most studies of science (2013). But science may be better understood as a human performance in the world. Rather than presenting science as a body of knowledge or collection of passively accumulated facts, science could be framed as a performed process or, as philosopher of science Catherine Elgin puts it, a “product of human endeavor...ineluctably connected to the ways we access the world” (2010, p. 446). In this white paper, I will briefly introduce science from the perspective of performance theory.

By examining science in the context of performance, we can approach certain key questions about science directly. How do scientists perform experiments and practice the scientific method (or, more accurately, scientific methodologies)? How does science rely on particular performer(s) and the particular contexts of those performances? What distinguishes the activity of science from other kinds of human performances? By reframing science as a human performance in the context of human practices and rituals, we more closely approach an accurate and communicable explanation of what the process of “doing science” actually is – because science is something humans do.

According to performance studies scholar Diana Taylor, performance is fundamentally process (2018, p. 8); the human process of practicing, imitating, and continually revising

embodied activities and behaviors. Performance theorist and performance studies founder Richard Schechner describes performance as a “restored behavior,” which is “never for the first time, [but]...for the second to the nth time” (Schechner 1985). Performance, then, is an unbroken chain of human re-performance. Performance lets others know that you can do something up to or beyond a standard (Schechner 2020); it necessarily involves the enacting of norms and “breaking norms” (Taylor 2016, 71). It is closely related to “ritual”—where rituals are those “patterned human activities”—significance (Wu 2018) which Schechner classifies as a type of performance (2020, 7) and which anthropologist Harvey Whitehouse describes as a “universal and ancient feature of human societies” (2012). As performers, humans occupy an “ecological niche” that has kept “bands [of humans] on the move in regular, repetitious patterns, following game, adjusting to the seasons, and creating art/ritual” (Schechner, 2020, p. 170). Whitehouse describes humans as “a ritual animal” (2021); we are a ritual animal precisely because we are a *performing* animal.

Rather than accepting ritual or performance as *theatricality* or *artifice*, I argue that performance, in part, structures the natural human world. To perform is not necessarily to pretend, but rather to behave, to show, to reveal, to implement, and to carry out. Or, as Schechner put it (2013, p.3), “Whatever you are doing right now, whoever you are at this moment, whatever you did when you began your day, you were and are performing.” Therefore, performance is not simple theatrics, but instead provides a framework for understanding almost everything humans do, especially those patterned and repeated motions that people do for some purpose.

Science then is performance first of all because the practice of science is rooted in human experience and activity. The collected information we refer to as “science” is produced by humans performing the methodology of science. Science is not just “a body of knowledge” but

also *embodied knowledge* accumulated via careful practice and nuanced interactions with the world. Science is performance because science is a practice enacted by humans in the world, guided by agreed-upon methods and involving the performance of experiments to actively test and retest hypothesized ideas.

Nothing scientists do is unembodied, and despite the all-pervading use of passive voice in the body of scientific literature, there is no science in the passive tense, no scientific work which completely erases the contribution of the researcher's missing capital *I*. Even in the most technical and remote experiments, instrumentation and contemporary AI serve most essentially as prostheses, which extend and enhance human sensory abilities and capacities as well as our minds themselves.<sup>1</sup> Each scientific experiment is also a collaboration. Diana Taylor ponders, “[M]aybe....there is no such thing as a ‘solo’ or one-person performance” (2016, p. 79) and likewise there is no solo scientific project. Each scientific tool is performative<sup>2</sup> in the sense that it enacts the collaboration of many bodies in a single measurement; the maker of the instrument, the inventor of the instrument, the refiners of the process of utilizing the instrument, the scientist utilizing the instrumentation at any particular instance—they all participate. The tool in and of itself and its operation is a collaboration and a summation of multiple performers and multiple performances.

Scientists (especially theorists) are often presented as solvers of abstract and complex formulae that seem to emerge only from their minds as they contemplate the universe. Yet scientists are even said to *perform* calculations, and the formulae themselves represent the interaction of the physicist with the observed world both as recorded in prior experiments

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<sup>1</sup> See Chalmers (1998).

<sup>2</sup> John L. Austin defines performativity as the power of language to effect change in the world. See Austin (1962) and Cavanaugh (2015) for discussion.

recalled by the equations and anticipated in experiments to come by hypotheses spurred on by new formulae. The scientists' formulae are performative in that they record and require activity in their very existence, and they present mathematical language which effect change in the world via their function as a harbinger of scientific experimental activity. The formulae demand new experiments, which are performed with increasing refinements as the hypothesis underwritten by the formulae is tested by embodied human beings or by machinery which function as *prostheses* for onlooking scientists.

Science is performance in the way that performance is a “‘continuum’ of...actions”<sup>3</sup> that are enacted,<sup>4</sup> embodied,<sup>5</sup> and practiced by humans and continually repeated, revised, reactivated, reenacted, and reinvented across varying contexts and media.<sup>6</sup> As a piece of performance art relies on the embodied activity of the performer, the performance of an experiment relies on the active embodiment of the scientist who performs it. Phenomenologist Merleau-Ponty argues that all of our scientific knowledge of the world is gained via our own “particular points of view,” our own “experience” (Fisher and Merleau-Ponty 1969). All of our scientific knowledge of the world is gained via our own points of view and experiences, and thus, he maintains, to subject science to scrutiny and understand its scope, we must “reawaken” a “basic experience of the world” which precedes abstracted knowledge (Merleau-Ponty). This precedence is critical, as the gathering of knowledge via experience precedes the repackaging and presentation of knowledge which we sometimes call “science.”

As in other human performances, such as dance or music informed by their own disciplinary-specific methods, the practice of science is also informed by the socio-cultural milieu in which it

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<sup>3</sup> Schechner, 2020, p. 7

<sup>4</sup> Taylor, 2016, p. 8

<sup>5</sup> Taylor, 2016, p. 36

<sup>6</sup> Schechner 2020, p. 13, p. 27; Taylor, p. 10, p. 26

is performed. In Daston and Galison's *Objectivity* (2007), the process of a scientific illustrator is used to explain the ongoing refinements in the performance of science as informed by the empirical knowledge of its historical location. The movement from idealized notions of symmetry in scientific illustration to the conceit of objectivity in mechanical documentation can be seen as a modified performance. Just as a melody or set of chords may be explored via classical piano or syncopated jazz, a scientific experiment may be performed differently with different trained judgments informed by differing historical values and epistemic virtues<sup>7</sup> (i.e., those qualities and traits considered valuable to the verification of knowledge). *Critically, both processes were good science*. Science is made through how it is performed.

As physicist and philosopher of science, David Bohm tells us, “science is an attempt to understand the universe and humanity’s relationship to nature” (2010, p. 16). But we cannot relate to a universe without interacting with it—we cannot touch an untouched universe or collect data passively without an active process of collecting. There is no perfect disembodied observer hovering above a pristine world; rather, scientists are doers who act on the world, change it, and are changed by it. Science is engagement with a universe that is also changing and engaging with us as we perform. As we change the world, the world changes our performance.

In the Collective Entanglements inquiry (2022) of the Integrated Arts Research Initiative at the Spencer Museum of Art, video artist Janet Biggs, mathematician Agnieszka Międlar, physicist Daniel Takaki, and collaborated on an artistic research project which culminated in an interactive 6-channel video and sound installation (which the collaborators sometimes called “an experiment”). During the process, understanding grew amongst the collaborators as they performed a study that integrated scientific data into the moving images displayed in the video

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<sup>7</sup> For a discussion of epistemic virtue see Daston and Galison (2007); see pp. 18-19, 27-28, 33-34, and the section beginning p.39.

installation. In the context of the collaboration, each individual's approach to some problem in their own field evolved and was refined. [https://hemisphericinstitute.org/images/courses/spring-2009/schechner\\_bta.pdf](https://hemisphericinstitute.org/images/courses/spring-2009/schechner_bta.pdf)

According to Irit Rogoff, research is “for ourselves as an activity, we...inhabit our numerous worlds differently as we inform ourselves and test out different ways to think a particular reality, which is the activity of research” (2018). This is the essence of science as performance. This is science as human curiosity performed in strategic exploration. The Collective Entanglements experiment highlights the performative grounding of science and hints at a fertile undergrowth of untapped and potentially subversive ideas<sup>8</sup> which becomes available if we practice science knowingly acknowledging the process of science as performance.

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<sup>8</sup> I am inspired here by Frank Moten's conceptualization of the “undercommons” (Harvey and Moten, 2013). Further research is indicated to explore the possibility that science as performance could transform traditional western conceptions of science and thus work towards the decolonization of scientific practice.

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Janet Biggs, Agnieszka Międlar, and Daniel Tapia Takaki, *Collective Entanglements*, six-channel video installation with sound and interactive whiteboards, 2022.

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