

Bottom-up citizen science projects could challenge authority of orthodox science through community-led investigations

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New approaches to research investigation are looking to go beyond blanket objectivity to include experiential knowledge and local contexts. [Dan McQuillan](#) looks at the counter-cultural roots of the citizen science movement where activists strove to put science at the service of the people. He argues the current field of citizen science could catalyse something equally new by explicitly questioning the hegemony of orthodox science.



There's a new form of counterculture afoot, although at first encounter it seems to be anything but. I'm talking about citizen science, and I think it could transform the terms on which science and society meet. This would be an unlikely revolution, as the goal of most citizen science projects is to be seen as [producing orthodox scientific knowledge](#) and to gain the approval of their professional betters. Participants work diligently on distributed fieldwork, enabling the managing scientists to work at previously infeasible scale, or through the online crowdsourcing of analysis, searching thousands of photos for the elusive signature of interesting data. Growth is massive, with projects like [Zooniverse](#) having more than a million registered users. [Citizen science associations](#) are forming and institutionalisation is kicking in. But on the fringes are projects that resonate more with the emergent values of the 1960s, with their emphasis on participatory experimentation, environmental sustainability and social justice.

But what is a counterculture and what on earth would it have to do with science anyway? [Theodore Roszak](#) coined the term to describe the youth movements that emerged in the 1960s. He saw the carnivalesque procession of hippies and the New Left as a single paradigm shift combining psychic and social revolution. But it's generally forgotten that he also characterised the counterculture as mobilising a vital critique of the scientific-technocratic worldview. A counterculture is lived as a transformative experience where people are changed at a psychic level through participation in unique events.

This sounds like the polar opposite of science, but history has a different story to tell. In 1970 an association called [Science for the People](#) (SftP) was born out of young physicists opposition to the role of Science in the Vietnam War. The first issue of their magazine included an article about leading Black Panther, Bobby Seale, alongside a piece entitled 'Women Demand Equality in Science'. Their attitude to putting science [at the service of the people](#) was, as one of the founders expressed it, "shit kicking", and in the process they pioneered critiques of nuclear power and genetic determinism. This brave effort to transform science ran until 1989 and drew its momentum from wider social movements and cultural change. The current field of citizen science could catalyse something equally new by explicitly questioning the hegemony of orthodox science.

There are interesting weaknesses at the core of scientific hegemony. While most scientists choose to present their practice publicly as an infallible machine for the production of truths, the opinions behind the curtain are far more mixed, and for good reason. Even hard science is not immune to distortion by group-think and social pathologies – witness [Lee Smolin's account](#) of the ascendance of string theory. And while reproducibility is the bedrock of scientific authority, asserting that the same experiments always get the same results irrespective of who is doing the experiment, a 2012 [study of landmark results](#) in cancer science was able to reproduce only 11 per cent of the original findings. But the unresolved fractures go further back. As [Isabelle Stengers](#) would have it, at least back to the confrontation more than a hundred years ago between Max Planck and Ernst Mach. While Mach wanted formulations that tied physical laws to the human practices that produced them, Planck argued successfully for 'the physicists faith' in truths that are unbounded by time, space or social-material specifics. Even many years after my

PhD in experimental particle physics I can remember the shared certainty that, whatever about art and culture, it was we who were probing the real truths of the universe. Although contemporary understandings of science are based on Planck's version, citizen science practices have the potential to re-open these questions in a productive manner.



Paulo Freire panel in CEFORTEPE – Training Centre, Technology and Research Education of the City Department of Education of [CampinasSP](#). Image credit: [Luiz Carlos Cappellano](#) (Public Domain, Wikimedia)

So what practices is it that could produce a more punk science from the community choirs of citizen science? There are projects like the [Extreme Citizen Science research group](#) (ExCiteS) who see citizen science as “a situated, bottom-up practice” that “takes into account local needs, practices and culture”. Or the [Public Laboratory for Open Technology and Science](#) which involves communities all the way from framing the research questions, to prototyping tools, to collating and interpreting the measurements. Public Lab’s mission is to “put scientific inquiry at the heart of civic life” and ExCiteS strives for “new devices and knowledge creation processes that can transform the world”. All these projects re-appropriate networked technologies, whether to enable environmental monitoring by indigenous communities in the Congo or by developing [do-it-yourself spectrometry kits](#) to detect crude oil pollution. The [Kosovo Science for Change project](#), where I am a researcher, has adopted the critical pedagogy of [Paulo Freire](#) as the starting point for our empirical investigations. Critical pedagogy is learning as the co-operative activity of understanding how our lived experience is constructed by power, and how to make a difference in the world.

There’s a chance, at least, that these currents could coalesce in to what [Deleuze and Guattari](#) referred to a smooth or nomadic science; one which does not have the ambition to totalise knowledge. Nomadic science is a form of empirical investigation that has no need to be hooked up to a grand narrative. The concept of nomadic science is a natural fit for bottom-up citizen science because it can valorise truths that are non-dual and that go beyond objectivity to include the experiential. As there is no a priori exclusion of provisional knowledges, it naturally inclines towards the local, the situated and the culturally reflective. The apparent unreliability of citizen science in terms of participants and tools, which is solely a source of anxiety at the moment, could become heuristic for nomadic science when re-cast through the forgotten alternatives like Mach’s formulation; that truths are never separated from the specifics of the context and process that produced them. In this sense, if in no other, a nomadic citizen science has the potential to carry through on the hopes that Roszak had for the counterculture; the renewal of a visionary

imagination along with a more human sense of community.

This post is based on the paper 'The Countercultural Potential of Citizen Science' which appeared in [M/C Journal](#), Vol. 17, No. 6 (2014)

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About the Author

Dan McQuillan is [Lecturer in Creative & Social Computing](#) at Goldsmiths College, University of London. He has a *Ph.D in Experimental Particle Physics* and worked as *Director of E-communications* for Amnesty International. He is co-founder of [Social Innovation Camp](#) and is one of the core team developing the citizen science project '[Science for Change Kosovo](#)'. He tweets as [@danmcquillan](#).

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