

## Extreme Citizen Literature, Science, and the Arts: A Comic Proposal for Our Fields

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In the aftermath of the Brexit referendum and only a week before the Inauguration of Donald Trump, I first sat down to consider the question posed by this special issue: What relations will exist, or should exist, between literature, science, and the arts? Though it seems an act of hubris to attempt to predict the future in this new, post-fact, post-science era, I propose that we model our interdisciplinary field on the practice called "citizen science," "the widening practice of noncredentialed people taking part in scientific endeavors" (Hannibal). This collaborative, co-created, bottom-up, and networked practice of carrying out scientific research in the liminal spaces between the main street, the marsh, the meadow and the mega-university can inspire us to forge a new set of practices for the interdisciplinary field of literature, science, and the arts.

The "Ten Principles" published by the European Citizen Science Association suggest that such projects actively incorporate citizens as "contributors, collaborators, or [as] project leader" to "generate new knowledge or understanding"; have a genuine outcome in terms of policy or action; benefit both the professional and lay people/citizens in ways as diverse as providing publication, creating personal pleasure, and enhancing social and political life on scales ranging from the local to the global; incorporate citizens in many different levels of the process, from design to dissemination; acknowledge and provide response to the citizens they engage; "democratize" their research approach, giving the opportunity for more public engagement; make the results of their investigations or activities widely available beyond the academic setting to the public, ideally in an open-access format; and are led by researchers who are sensitive to a wide range of ethical issues, including "data sharing agreements, confidentiality, attribution, and the environmental impact" the activities may have ("Ten Principles of Citizen Science" [ecsa.citizen-science.net/taxonomy/term/205](http://ecsa.citizen-science.net/taxonomy/term/205)).

We need to expand this model in two ways. First, we must create a joint field of Citizen Literature, Science and the Arts. Consider the remarkable shift in orientation such a field would produce in how we *do* literature, science, and art. We would now practice scholarship that is not only interdisciplinary, but also ethically attuned, freely disseminated, infused throughout with respect for amateur practitioners in the key fields, and yielding a powerful, productive, and highly pleasurable engagement with the public on both local and global levels.

Rather than pausing at this cheerful fantasy, however, we must make one more modification in the concept of Citizen Science: we must problematize its core term. "Citizen" has for too long been used to regulate and exclude individuals and groups from the state and its institutions: women, people of color, indigenous peoples, people with non-normative sexualities, and people with disabilities. Reframed as "Extreme Citizen Science," our projects must be "designed, carried out, and created in collaboration indigenous people (Hannibal).<sup>1</sup> "What's extreme about them," Hannibal explains, "is that instead of subscribing to the top-down, hierarchical approach of Western science, these projects are resolutely bottom up. They address local needs

and rely on networking to create new kinds of knowledge to achieve real-world results. Co-created projects fundamentally question what science is, who gets to do it, and what it is for" (Hannibal). As Viviane Namaste describes, such projects incorporate three crucial principles: relevance, equity in partnership, and ownership (Namaste).

This applied language and activist engagement may seem uncomfortably far from our work as scholars of literature, science, and the arts. But with the National Endowment for the Arts, the National Science Foundation, the National Institutes of Health and the National Endowment for the Humanities all at risk, we are far beyond our comfort zones. Extreme Citizen Literature, Science, and the Arts is now the proper model for our interdisciplinary field. Three current examples of such work can demonstrate the difference it can make for us as scholars and for our era.

My first example of an Extreme Citizen Literature, Science, and the Arts project is The Scale Free network, a Melbourne, Australia based arts-science collaborative whose members include graphic artist, Briony Barr; microbial ecologist, Gregory Crocetti; writer Alisa Wild; artist, Aviva Reed; and science advisor and microbiologist Linda Blackall. Together with other project-based collaborators, including teachers, science educators, and school students, they publish *Small Friends Books*, a series that illuminates the multi-scaled importance of the concept of symbiosis. To date, they have published three books, aiming at the adult and child markets simultaneously.

Their first publication was *The Squid, the Vibrio & the Moon* (2014), written with the collaboration of the Hawaii laboratory of Margaret McFall-Ngai. This exquisite book tells the story of the symbiotic relationship between the bioluminescent bacteria *Vibrio fischeri* and the Hawaiian Bobtail Squid ([glowingsquid.org/](http://glowingsquid.org/)). Their next book, *Zobi and the Zoox* (2015), adopts the perspective of one coral polyp on the Great Barrier Reef to demonstrate how a symbiotic relationship with rhizobia bacteria is enabling corals to adjust to rising sea temperatures. Their most recent book, *The Invisible War* (2016), the product of collaboration between researchers at San Diego State University and the Institute Pasteur, uses the story of an Australian nursing sister on the Western Front in World War I as a platform to explore the complex relations between human beings, bacteria, and bacteriophages.

Scale Free Network's publications are the product of collaborations between amateurs and professionals in the fields of Literature, Art, and Science. They are also instantiations of the theoretical insights of Lynn Margulis, whose research increasingly inspires scholars working a range of fields, from new materialism to eco-evo-devo biologists, to "proceed from the premise that phenomena are always already intra-acting and [with] an inherent suspicion towards individualism." (Hird 20) Presenting their work to the 8<sup>th</sup> Congress of the International Symbiosis Society in 2015, Crocetti and Barr's remarks testified to the importance of Margulis in the interweaving of process and theme that these books exemplify: "The books tell stories about symbiotic relationships between microbes and larger forms of life—presenting an opportunity for researchers of different symbioses to share their findings with the world, one story at a time" ([www.smallfriendbooks.com/collaborators/](http://www.smallfriendbooks.com/collaborators/), Crocetti and Barr, 2016).

I have said that extreme citizen science projects challenge a hierarchical construction of knowledge, include marginalized groups and discourses in their design and formulation, and disseminate their research widely. Such is definitely the case with the books created through literature, art and science collaborations by Scale Free

Network. Their first two books are aimed at elementary age school children, and they draw on strategies of literary and artistic communication such as personification, personal narration, and multiple perspectives, to bring scientific research outside of the academy to create a new audience and new potential collaborators. Each book has an extensive appendix that incorporates photographs, statistics, historical research, micrographs, and diagrams providing guidance for those readers who want to do further research "into the mechanisms behind the symbiosis" (Crocetti & Barr 2016, 5). The collaboration at multiple educational scales is a trademark aspect of these projects.

Scale Free Network's third publication, *The War Inside: A Tale at Two Scales*, is a work of graphic medicine drawn by illustrator Ben Hutchings and written by Ailsa Wild in collaboration with Dr. Jeremy Barr. This comic incorporates visual, verbal, geographic and historical scaling to tell the story of the symbiotic relationship between its human protagonist, an Australian nurse on the Western Front in the First World War, and its microscopic 'protagonists.' As the war outside rages, a war inside occurs between the *Shigella flexneri* bacteria, cause of a potentially case of lethal dysentery, and the rapidly mutating bacteriophage viruses that are, in the end, victorious. As Dorion Sagan has observed, these "bacteriophages, happy in the mucus of the intestine, from which they can be deployed to kill killer bacteria . . . are heroes no less than the Australian nurses in Crocetti, Barr and company's killer book" (Sagan 2016).

Working to create a network of relations and ideas between professional artists, writers, scientific researchers and amateur adults and children, but more than that to get these various human subjects to decenter their own perspectives and focus on microbial life and viruses at the borders of the living and non-living, the projects of Scale Free Network live up to their name, rejecting intellectual, material, and causal hierarchies.

The second example of Citizen Literature, Science and Art I offer is the widespread practice of collaborating to create comics and zines—inexpensive pamphlets or booklets that use text and images to explain, absorb, express, and share scientific knowledge. I have written earlier about *Not Your Mother's Meatloaf*, a co-authored sex education comic / zine, originally online, created by Saiya Miller and Liza Bley (Squier 2014). Elevating personal experience over expert knowledge, and welcoming a wide range of artistic and literary styles, this comic project exemplifies the emancipatory potential of Extreme Citizen Literature, Science, and the Arts.

Scholarship on the zines movement forges a link between amateurs and professionals, research and activism. For example, biologist and liberal arts professor Andrew Yang has surveyed a range of zines created as part of "participatory literacy" projects whose aim was to move students from being "simply consumers of scientific knowledge" to becoming "more engaged in the wider ecology of information that they are inevitably a part of" (Yang 2010, 573). Although Yang frames the projects as "science zines," their meticulous attention to materials, combination of text panels and image panels, and free dissemination exemplifies the democratization of literature and art that is characteristic of the process of comics creation. For scholars of literature, science and the arts, engaging in such participatory projects requires us to expand our definitions of art, literature and science from the professional to the amateur, stretch what we consider our appropriate audience beyond the academy to the lay community of adults and children; and reformulate what we consider a good research outcome to include expanded visual, verbal and scientific literacy, amateur and community

engagement in practicing literature, science, and the arts, and documentation of the same (Yang 2010).

I draw my concluding example from a project *in medias res*, *Journeys to Complete the Work: A Comic about NAGPRA*. Still in the works, this comic is the collaborative project of public anthropologist Sonia Atalay, cultural anthropologist Jen Shannon, and freelance archaeological illustrator John Swogger. The latter has established a track record in science, literature and art collaborations, having previously illustrated *Something Different About Dad*, a comic about Autism/Asperger's Syndrome (2010) and collaborated as an illustrator on *BioEnergy: A Graphic Introduction* (2016), informational comic addressing climate change and the challenges of transitioning to a low-carbon energy future (SuperGen Bioenergy Hub, 2016).

*Journeys to Complete the Work* had its debut at the conference on "Indigenous Storytelling and the Law" held by the Center for Native American and Indigenous Studies at the University of Colorado, Boulder. Atalay and Shannon presented an initial ten pages featuring "some introductory explanation about what NAGPRA is and how it works, and [telling] the story of a repatriation of material back to Anishiaabek tribes from museum collections held by the University of Michigan" (Swogger 2016). The Native American Grave Protection and Repatriation Act, signed into federal law in 1990, calls for all institutions receiving federal funding to return or repatriate human remains, funerary or sacred objects, and objects of cultural patrimony to the lineal descendants of the Indian tribe to which they can be traced, or to those peoples culturally affiliated with them.

Will this collaboratively created comic documenting one such act of NAGPRA repatriation exemplify the principles of Extreme Citizen Literature, Science, and the Arts? This depends, in part, on the extent to which the Anishiaabek tribes were involved in its formulation, design, and execution. Certainly the comic seems to have as a central purpose the creation of a non-hierarchical meeting between differently situated groups. "It aims to explain the Native American Graves Protection and Repatriation Act from the perspective of people who have been involved in the complex process of repatriating the remains of indigenous peoples, whether they are Tribe members, scholars, or museum curators" (Swogger, "NAGPA and Comics").

As Potowotami philosopher Kyle Whyte has observed, "high stakes mega-concepts such as the Anthropocene, are discussed in contexts located at a galactically far remove from the everyday work of Indigenous peoples and persons [which is] to maintain persisting relationships and create emerging relations with plants, elements, animals, landscapes and insects in rapidly changing ecosystems" (Whyte 2017). It may indeed be an act of hubris to predict the future. But it would also be a mistake to ignore this present moment, when we have a powerful opportunity to expand the communities interested and engaged with our scholarly work.

We have considered three different projects based on the collaborative creation of comics, traditionally the medium of the underdog. Using the tools of literature, art, and science, these projects share the vision Kyle Whyte explains so powerfully. They are dedicated to maintaining and creating relationships between human beings and "plants, elements, animals, landscapes and insects in these rapidly changing ecosystems." They are committed to relevance, equity in partnership and ownership. And they work collaboratively with those historically left out of the category of citizen. In short, these collaborative comics projects model for us a way forward: the practice of Extreme Citizen Literature, Science, and the Arts.

## Notes

1. This term was created by Muki Haklay and Jerome Lewis, the codirectors of the Extreme Citizen Science Research Group, who define it this way: "a situated, bottom-up practice that takes into account local needs, practices and culture and works with broad networks of people to design and build new devices and knowledge creation processes that can transform the world." See [www.ucl.ac.uk/excites](http://www.ucl.ac.uk/excites)

## Works Cited

- Crocetti, Gregory and Briony Barr. "Stories of Symbiosis." *Symbiosis*, 2015. DOI: 10.1007/s13199-015-0349-8.
- Hannibal, Mary Ellen. *Citizen Scientist: Searching for Heroes and Hope in an Age of Extinction*. Kindle Edition. The Experiment, LLC, 2016.
- Hird, Myra J. *The Origins of Sociable Life: Evolution After Science Studies*. Palgrave Macmillan, 2009.
- Miller, Saiya and Liza Bley. *Not Your Mother's Meatloaf: A Sex Education Comic Book*. Soft Skull Press, 2013.
- McFall-Ngai, Margaret, & Edward Ruby. *The Squid Vibrio Labs*. [glowingsquid.org/](http://glowingsquid.org/). Accessed 23 June 2017.
- Namaste, Viviane. "Undoing Theory: The 'Transgender Question' and the Epistemic Violence of Anglo-American Feminist Theory." *Feminist Theory Reader: Local and Global Perspectives*, edited by Carole R. McCann and Seung-Kyung Kim, Routledge, 2017, pp. 608-621.
- Sagan, Dorion. "Science Book a Day Review of *The Invisible War*." 21 Apr. 2017. [sciencebookaday.com/2016/04/21/dorion-sagan-reviews-the-invisible-war-a-tale-of-two-scales/](http://sciencebookaday.com/2016/04/21/dorion-sagan-reviews-the-invisible-war-a-tale-of-two-scales/). [scalefreenetwork.com.au/](http://scalefreenetwork.com.au/)
- Squier, Susan M. "Comics in the Health Humanities: A New Approach to Sex and Gender Education." *Health Humanities Reader*, edited by Delese Wear et al., Rutgers UP, 2014, pp. 226-241.
- Swogger, John. *BioEnergy: A Graphic Introduction*. SuperGen BioEnergy Hub. [www.supergen-bioenergy.net/comic/](http://www.supergen-bioenergy.net/comic/). Accessed 23 June 2017.
- Swogger, John. "NAGPRA and Comics." 18 Mar. 2017. [johnswogger.wordpress.com/](http://johnswogger.wordpress.com/).
- Swogger, John. *Something Different About Dad: How to Live with your Asperger's Parent*. Jessica Kingsley Publishers, Ltd., 2010.
- "Ten Principles of Citizen Science." 11 May 2016. [ecsa.citizen-science.net/engage-us/10-principles-citizen-science](http://ecsa.citizen-science.net/engage-us/10-principles-citizen-science).
- Whyte, Kyle Powys. "The Roles for Indigenous Peoples in Anthropocene Dialogues: Some Critical Notes and a Question." 1 Jan. 2017. [Inhabitingtheanthropocene.com/2017/01/25](http://Inhabitingtheanthropocene.com/2017/01/25).
- Wild, Ailsa, et al. *Zobi and the Zoox*. Small Friends Books, 2015.
- Wild, Ailsa, Aviva Reed, & Dr. Gregory Crocetti. *The Squid, The Vibrio & the Moon*. Small Friends Books, 2014.
- Wild, Ailsa, Scale Free Network et al. *The Invisible War: A Tale at Two Scales*. Small Friends Books, 2016.
- Yang, Andrew. "Engaging Participatory Literacy through Science Zines." *The American Biology Teacher*, vol. 72, no. 9, pp. 573-577.