

1 **Gang science: a façade of numbers**

2

3 Robert J. Warren II^{1,2} and Mark A. Bradford²

4 ¹Department of Biology, Buffalo State College, 1300 Elmwood Avenue, Buffalo, NY 14222,

5 USA; ²School of Forestry and Environmental Studies, Yale University, New Haven, CT 06511,

6 USA

7 Corresponding author: Robert J. Warren II, +1 8285061253; hexastylis@gmail.com.

8

9 Petitions have a long history in religion (e.g., prayer), law (e.g., legal redress) and government
10 (e.g., ballots). Scientists and science organizations increasingly join the fray by employing
11 petitions to influence public opinion and government decisions. By adding the signatures of
12 multitudes of qualified scientists, the petitioners try to garnish trust among those who may not
13 understand the debate. A worrying trend, however, is the use of petitioning in scientific debates
14 to stifle unpopular ideas. Shouting down opponents is the methodology of a gang, and adding
15 signatures to rebuttals is the conduct of gang science. We argue that, at best, the petition culture
16 is ineffective. At worst, it undermines scientific discourse.

17

18 Petitions have become a numbers game. Eighteen national scientific societies support the
19 findings of the Intergovernmental Panel on Climate Change ¹. Another organization claims
20 31,000 signatures by scientists that reject global warming ², a January 2012 Wall Street Journal
21 letter has 16 signatures by scientists saying there is no need to panic about global warming ³, and
22 50 NASA scientists and astronauts sent an open letter asking the agency to refrain from linking
23 climate change with human activities ⁴. Many more scientists could be asked to sign a petition

24 that accepts climate change evidence and the role of humans in causing it. Do more signatures
25 win? The National Center for Science Education started ‘Project Steve’ to support the teaching
26 of evolution and parody petitions calling for creationism⁵. The petition is signed by more than
27 1,200 scientists; all called ‘Steve,’ and it has more signees than the petitions circulated by the
28 creationists. If the creationists get 1,201 signatures, do they win the debate?

29
30 Gathering signatures has a long tradition in advocacy groups, and so overuse of petitions may
31 give the impression that scientists are an advocacy group with an agenda just like any other
32 lobbyist. And despite the use of petitions, numbers and logic can be ineffective at swaying public
33 opinion and political decisions⁶. Whereas scientific consensus does influence public opinion⁶,
34 petitions can give the impression of scientific consensus on either side of debate. Moreover, the
35 general public is unable to distinguish between individuals with scientific-sounding affiliations⁷.
36 A renowned scientist like James Hansen has credibility equal to a charlatan like Fred Singer.
37 Petitions give the impression that science is about consensus and collusion rather than discovery
38 and verification. An emerging and disturbing trend is the use of petitions to attack scientific
39 arguments in peer-reviewed journals.

40
41 The use of petitions in scientific debate currently is uncommon, but top journals have broken
42 their own rules and permitted ridiculously long author lists. This journal published a letter titled,
43 “Non-natives: 141 scientists object”⁸. The piece dismissed the ideas of 19 scientists on how
44 introduced species should be managed. An equally large group of scientists (137 co-authors)
45 claimed three of their peers had misunderstood and misrepresented the debate about the
46 evolution of eusociality^{9,10}. This trend suggests we should judge the validity of ideas by the

47 number of authors. It is replicated data, not signatures, that validates science¹¹. Science advances
48 when we spend time measuring and thinking rather than collecting signatures. Gang science
49 suppresses dissent and preserves established hierarchy and ideas. It is hard to imagine 100+
50 authors contributing much more than intimidation.

51

52 We already filter ideas through peer-review, citations and grant panels; petitions are not needed
53 as an additional filter. Instead, we should work to engender a culture of debate based on ideas,
54 not coercion, where scientists are inspired “to set the cause above renown, to love the game
55 beyond the prize.”¹²

56

- 57 1 UCSUSA. *Union of Concerned Scientists*,
58 <<http://www.ucsusa.org/assets/documents/ssi/climate-change-statement-from.pdf>>
59 (2009).
- 60 2 GWPP. *Global Warming Petition Project*, <<http://www.petitionproject.org/>> (2012).
- 61 3 Journal, W. S. *No Need to Panic About Global Warming*,
62 <[http://online.wsj.com/article/SB10001424052970204301404577171531838421366.html](http://online.wsj.com/article/SB10001424052970204301404577171531838421366.html?mod=WSJ_Opinion_LEADTop)
63 <[?mod=WSJ_Opinion_LEADTop](http://online.wsj.com/article/SB10001424052970204301404577171531838421366.html?mod=WSJ_Opinion_LEADTop)> (2012).
- 64 4 Insider, B. *49 Former NASA scientists Send a Letter Disputing Climate Change*,
65 <<http://www.businessinsider.com/nasa-scientists-dispute-climate-change-2012-4>>
66 (2012).
- 67 5 NCSE. *Project Steve - National Center for Science Education*, <[http://ncse.com/taking-](http://ncse.com/taking-action/project-steve)
68 <[action/project-steve](http://ncse.com/taking-action/project-steve)> (2008).
- 69 6 Ding, D., Mailbach, E. W., Zhao, X., Roser-Renouf, C. & Leiserowitz, A. Support for
70 climate change policy and societal action are linked to perceptions about scientific
71 agreement. *Nature Climate Change* **1**, 462-466 (2011).
- 72 7 Anderegg, W. R. L., Prall, J. W., Harold, J. & Schneider, S. H. Expert credibility in
73 climate change. *Proceedings of the National Academy of Sciences* **107**, 12107-12109
74 (2010).
- 75 8 Simberloff, D. Non-natives: 141 scientists object. *Nature* **475**, 153-154 (2011).
- 76 9 Nowak, M. A., Tarnita, C. E. & Wilson, E. O. Inclusive fitness theory and eusociality.
77 *Nature* **466**, 1057-1062 (2010).
- 78 10 Abbot, P. & co-authors. Inclusive fitness theory and eusociality. *Nature* **471**, E1-E3
79 (2011).
- 80 11 Kuhn, T. S. *The Structure of Scientific Revolutions*. (University of Chicago Press, 1962).
- 81 12 Phillips, J. The biotic community. *J Ecol* **19**, 1-24 (1931).

82

