

# The Complicated Morality of Named Inventions

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In science, the inventors of theories, methods, and instruments along with discoverers of physical phenomena or mathematical laws have often been celebrated and immortalized by associating their name with their technical contribution. This tradition has positive aspects: named inventions are a constant reminder that we stand on the shoulders of giants of the past and that science is carried out by people. Thus, naming discoveries after their inventors can be both useful and cheerful. However, the negative impacts of exclusion arising from bias along race, gender, and geography, as well as placing focus on individual researchers rather than the research teams that are often responsible for the discoveries, is not without consequence.

Beyond these biases that come with naming discoveries, we argue that one should also consider the wider background of the scientists celebrated by named discoveries (Figure 1). If the person behind the discovery, for example, advocated unacceptable offensive views, supported oppressive regimes, or war crimes then one needs to carefully consider if that person deserves celebration.

The understanding of history in the context of our present is challenging. Almost every person in history has done or said things that are inappropriate by today's standards. Similarly, some of the behavior that we find normal now may be perceived unethical at some point in the future. It would therefore be unfair not to take into account that norms and values are subject to continuous changes. However, there are some clear cases of widely celebrated scientists whose behavior crossed the line already at their time, as we detail below. Celebrating such a scientist sets an example of what we, as a community, find admirable, and may therefore give the impression that unethical behavior is accepted as long as someone's science is of high quality.

The conversation about removing scientists' names from discoveries emerging from their work draws many parallels to the discussions ongoing more broadly about the celebration of controversial historic figures, or the challenges faced by universities in grappling with their scientific celebrities' darker sides. When does a named discovery need to be renamed? Who decides? What if public opinion changes back and forth? How should we celebrate scientific discoveries without being blind toward the people behind the science? How should we deal with inventions named after multiple scientists, of which only one has shown morally questionable behavior? These are not simple questions with simple answers. We should likely, in general, avoid overly harsh judgment of historic figures and

place things in perspective considering the ethical framework of their times. However, we do have an obligation to be circumspect in naming conventions moving forward, cognizant of the pros and cons of these decisions.



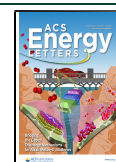
**Figure 1.** In naming inventions and discoveries we should carefully consider inclusion and diversity. (Source: Shutterstock)

Some celebrated scientists have a darker side. For example, Fritz Haber was awarded the Nobel prize in 1918 for his contributions to inventing the “Haber–Bosch process”,<sup>1</sup> which enables producing ammonia from nitrogen and hydrogen on a large scale. This invention has proven critical in creating fertilizer to support agriculture and thereby feeding billions of

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people. On the other hand, Haber, as a militant patriot, started a research program on war gases, in spite of these being prohibited at the time. In 1915, he introduced chlorine gas and was involved in its use as a chemical weapon.<sup>2,3</sup> As a consequence, Haber's Nobel prize was already controversial at the time, and he remains a figure of debate nowadays.<sup>4</sup>

Other cases are more subtle, such as the Dutch–American physicist Peter Debye who was awarded the Nobel prize in chemistry in 1936. In 2006 it became public that in 1938, Debye, at the time president of the German Physical Society DPG, signed a letter to dismiss the last remaining Jewish members from the society.<sup>5</sup> The media outrage caused by publication of the letter by the Dutch magazine *Vrij Nederland* led Utrecht University to remove Debye's name from their institute for nanomaterial science, and the University of Maastricht discontinued the annual Debye prize for scientific research.<sup>6</sup> However, a subsequent investigation into Debye's professional and private life revealed the complexity of living under the Nazi regime. Historical documents in fact suggest that Debye helped several Jewish citizens, including the physicist Lise Meitner, to escape from the Nazi regime.<sup>7</sup> In 2007, a Dutch committee concluded that Debye was an “opportunist”,<sup>8</sup> and the Dutch universities reverted from the removal of Debye's name from their institute and prize.<sup>9</sup> Similarly, Cornell University, where Debye worked from 1940 to 1952, concluded after an investigation into the matter that there was no evidence of Debye supporting the Nazi regime and decided to not dissociate Debye from their university.<sup>10</sup>

Like these examples, many cases are nuanced and need careful consideration. We argue, however, that some cases are clear-cut and that the scientific community should, in these cases, refrain from naming key discoveries and creating scientific jargon after people whose views are exposed as harmful, offensive, and completely unacceptable *already during their own lifetime*.

A particularly stark example is William Shockley. He played a pivotal role in the emergence of semiconductors for computation, which forms the basis of our modern world. Together with Hans-Joachim Queisser he also derived the efficiency limit for single-junction solar cells by considering the detailed balance of thermodynamics in a seminal paper in 1961.<sup>11</sup> This physical behavior and associated performance limit is often called “Shockley–Queisser limit” or shortened to the SQ-limit.

Shockley held openly racist and eugenicist views even during the late 20th century.<sup>12</sup> He advocated for racism and dysgenic theories, collaborated with extremist groups, and even pursued pseudoscientific studies aiming to link intelligence to skin color.<sup>13</sup> For example, he distributed the obviously false claims that IQ is linked to race and advocated for a program where low-IQ women would be paid to undergo sterilization. He was involved in a large fraction of the controversies in intelligence research,<sup>14</sup> and hence, using his name has caused strife in the past.<sup>15</sup> A scientist who advocates without contrition views that are not only extremely offensive but base and dehumanizing should not be celebrated by the scientific community without reflection and careful consideration.

The prestige and inherent trust that comes with a Nobel prize or other awards makes top scientists extremely powerful voices, even in fields far outside their area of expertise. Systematically abusing that power in a harmful way with deliberate intent as William Shockley did, in our view,

disqualifies him from the attention and honor of being associated with the critical phenomena and physical behaviors that the community continues to examine.

Although only recently becoming more well-known, and founded on the considerable historical documentation, the case of William Shockley is thus very clear, as his views place him well outside the norms even for his own time. We hence argue that the energy science community should consider refraining from using the currently common “Shockley–Queisser limit” and instead use terms like “detailed-balance limit” or “thermodynamic limit for single-junction solar cells”.

Beyond this example we would like to encourage a broader discussion about the value of named discoveries, both of the past and future. The real stories of scientific advance often involve many actors with a wide variety of different types of critical contributions.<sup>16</sup> Naming scientific terms after the phenomena or effects rather than individuals can also lend itself to including those whose stories and contributions have impacted the science we admire and want to emulate. Basing the name with inclusive priorities may provide a path to a richer, deeper, and more robust understanding of the science and its advancement. By carefully naming institutes and inventions, we can set the tone that we collectively disapprove of the spreading of discriminative views about race, gender, religion, or sexual orientation and instead would rather promote a more expansive, diverse, and ultimately successful scientific community.

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## ■ REFERENCES

- (1) Fritz Haber – Facts. NobelPrize.org. Nobel Media AB 2020. <https://www.nobelprize.org/prizes/chemistry/1918/haber/facts/> (accessed 2020-12-21).
- (2) Huxtable, R. J. Reflections: Fritz Haber and the Ambiguity of Ethics. *Proc. West. Pharmacol. Soc.* **2002**, 45, 1–3.
- (3) Everts, S. Who Was the Father of Chemical Weapons? *Chem. Eng. News* **2017**. <http://chemicalweapons.cenmag.org/who-was-the-father-of-chemical-weapons/>
- (4) Ritter, S. Three Takes On Haber. *Chem. Eng. News* **2006**, 84 (6), 29–31.
- (5) Rispens, S. *Einstein in Nederland. Een Intellectuele Biografie*; Ambo/Anthos, 2006.

- (6) Enserink, M. Blocking a Book, Dutch University Rekindles Furor over Nobelist Debye. *Science* **2006**, 312 (5782), 1858.
- (7) Ginkel, G. van. *Prof. Peter J.W. Debye (1884–1966) in 1935–1945. An Investigation of Historical Sources*; RIPCEN, 2006.
- (8) Reiding, J. Peter Debye: Nazi Collaborator or Secret Opponent? *Ambix* **2010**, 57 (3), 275–300.
- (9) Ball, P. Letters Defend Nobel Laureate against Nazi Charges. *Nature* **2010**, DOI: [10.1038/news.2010.656](https://doi.org/10.1038/news.2010.656).
- (10) Abruña, H. D. Letters: Peter Debye. *Chem. Eng. News* **2006**, 84 (30).
- (11) Shockley, W.; Queisser, H. J. Detailed Balance Limit of Efficiency of P-n Junction Solar Cells. *J. Appl. Phys.* **1961**, 32 (1961), 510–519.
- (12) Shockley, W. Models, Mathematics, and the Moral Obligation to Diagnose the Origin of Negro IQ Deficits. *Rev. Educ. Res.* **1971**, 41 (4), 369–377.
- (13) The Southern Poverty Law Center. William Shockley.
- (14) Carl, N.; Woodley of Menie, M. A. A Scientometric Analysis of Controversies in the Field of Intelligence Research. *Intelligence* **2019**, 77, 101397.
- (15) Gwynne, P. ‘Shockley Park’ Stirs Racism Row. *Phys. World* **2009**, 22, 9.
- (16) Van Laar, B.; Schenk, H. The Development of Powder Profile Refinement at the Reactor Centre Netherlands at Petten: *Acta Crystallogr. Sect. A: Found. Adv.* **2018**, 74 (2), 88–92.