nized everyone around them. I know of one faculty member who threw a tantrum in the middle of a meeting and had to be sent for anger management training. I remember another who boasted about being known for "colorful language," wearing it almost as a badge of honor. Then there are the so-called leaders who make their staff's lives unnecessarily difficult. Such conduct has no place in a civilized society, let alone the hallowed halls of academia.

Scientists, physicists included, do not generally receive training in communication and other interpersonal skills. But active listening and the ability to engage in amicable discussion and debate are skills that can and should be included in our science curriculum. As the proverb goes, "With all thy getting get understanding."

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A note on 100 kW laser power

The January 2024 PHYSICS TODAY article titled "The new laser weapons" (page 32), by Tom Karr and Jim Trebes, reports, "In 2015, General Atomics, the contractor for the distributed-gain laser, achieved 100 kW class power—at the time the highest average power ever achieved in an electrically pumped laser." In fact, Northrop Grumman and Textron Defense Systems—in 2009 and 2010, respectively—had already each independently demonstrated 100 kW average power from solid-state slab lasers.[1] I was the vice president of directed-energy weapons at Textron Defense Systems at the time of that work, which took place under the Joint High Power Solid State Laser program, funded by the Defense Department's High Energy Laser Joint Technology Office under contract with the US Army Space and Missile Defense Command.

The subsequent General Atomics demonstration, funded under the Defense Advanced Research Projects Agency's High Energy Liquid Laser Area Defense System program, focused on significant weight and volume reductions compared with the earlier demonstrations in order to facilitate integration into airborne platforms.

Reference

1. J. Hecht, "Photonic frontiers: Military lasers: A new generation of laser weapons is born," *Laser Focus World*, 1 April 2010.

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► **Karr and Trebes reply:** Due to length constraints, we omitted discussion of many significant directed-energy efforts, including the Joint High Power Solid State Laser (JHPSSL) program. We regret any misunderstanding resulting from the briefness of our article. It was never our intention to slight the accomplishments of the JHPSSL program, its contractors, or the many other directed-energy-weapons achievements of other contractors.

We are happy to set the record straight. John Boness is correct. The JHPSSL program had two competing contractors: Textron Defense Systems and Northrop Grumman. Both contractors built electrically pumped solid-state lasers. The architecture of both JHPSSL lasers was a coherent phased array of solid-state media pumped by laser diodes and lasing in a "zigzag" geometry. Each demonstrated 100 kW average power with good beam quality in 2009–10. It was a great achievement by both contractor teams, and it motivated the high-energy-laser community to focus additional effort on electrically pumped solid-state lasers. We noted the achievement and included references to work by Textron Defense Systems and Northrop Grumman[1–3] in our initial manuscript. We deleted discussion of the JHPSSL in later revisions, shortening the article and focusing it on current developments. Despite its success, the JHPSSL architecture was not used in any subsequent US Department of Defense high-energy-laser program.

The Defense Advanced Research Projects Agency (DARPA) in 2004 funded General Atomics for its distributed-gain laser—a laser architecture that promised better scaling to higher power, lower specific volume, and lower specific mass than the JHPSSL architecture. The exact power achieved by the DARPA program has not been publicly released; we can say that by 2015 it achieved "100 kW class power." We stand by our statement that General Atomics' solid-state, distributed-gain laser in 2015 had "the highest average power ever achieved in an electrically pumped laser." General Atomics further advanced its distributed-gain laser under the DOD's High Energy Laser Scaling Initiative (HELSI). In 2023 a General Atomics distributed-gain laser achieved average power greater than 300 kW.

In 2022 under the HELSI program, nLIGHT and Lockheed Martin also demonstrated 300 kW average power high-energy lasers with diode-pumped fiber lasers—coherently and spectrally combined, respectively. Northrop Grumman is under contract to achieve a similar milestone. As part of the Solid-State Laser Technology Maturation program, in 2019 the US Navy installed Northrop Grumman's Laser Weapon System Demonstrator—a 150 kW average power diode-pumped fiber laser weapon—on the USS *Portland*, where it stayed until 2023. It is the highest average power directed-energy weapon ever deployed by the US.

References

1. D. E. Klimek, A. Mandl, in *High-Power Laser Handbook*, H. Injeyan, G. D. Goodno, eds., McGraw-Hill (2011), chap. 9.
2. Northrop Grumman Corp, "Northrop Grumman-Built Joint High Power Solid State Laser Keeps Lasing . . . and Lasing . . . and Lasing . . .," press release, 8 December 2010.
3. J. Hecht, "Photonic frontiers: Military lasers: A new generation of laser weapons is born," *Laser Focus World*, 1 April 2010.

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