



Dawnielle Farrar-Gaines

Engineer, professor, and advocate of interdisciplinary work

By **Rahul Rao**

To Dawnielle Farrar-Gaines, professor of Materials Science and Engineering at Johns Hopkins University, materials is far more than just a subfield of either science or engineering. To her, it is a hybrid of sorts, and is reflective of her background: she studied physics, chemistry, and electrical engineering at the undergraduate and graduate level, only shifting into materials while pursuing her PhD degree.

Even today, still affiliated with the university where she received her doctorate, Farrar-Gaines works in a very multidisciplinary arena. Her research as a senior staff member at the Johns Hopkins Applied Physics Laboratory exemplifies this: much of her work is interdisciplinary, crossing materials with outer space, military applications, and otolaryngology—the medicine of the ear, nose, and throat—and her work exists at the cutting edge of these fields.

She has received multiple patents, with a number of them related to the use of piezoelectric materials in applications ranging from underwater acoustics to middle ear implants for hearing restoration. “I view my patents,” she said, “as an example of my contributions toward the advancement of the field.” The days of leveraging a single discipline, she said, are gone. “Be open-minded,” she advises new students.

Farrar-Gaines’s work involves the creation and manipulation of materials and systems, sometimes small enough to fit on the edge of a piece of paper, but large enough in impact to change lives. She also teaches a graduate level course at the Johns Hopkins University Whiting School of Engineering in the Materials Science and Engineering (MS&E) Department and serves on the MS&E Program Committee.

Outside of her teaching and research efforts, Farrar-Gaines is very passionate about inspiring the next generation of scientists, engineers, and technologists. She gives numerous presentations in a variety of community-related activities, and mentors students at all levels, from undergraduates to postdocs. She also serves on the advisory board for the Every Girl Can Learning Institute, Inc., a nonprofit organization that helps introduce young girls to STEM and foster their interest early, while providing other life skills needed to be successful in today’s society.

“My primary objective,” she said, “is not only to give back to future generations, but also ensure that they recognize the greatness within them and choose to pursue it, whether STEM is their area of interest or not.”

Of all the educational outreach activities Farrar-Gaines has conducted, she is most proud of two interactive workshops she

developed for middle and high schoolers to help cultivate interest in the STEM fields while making science and technology seem “cool.” These workshops reflect Farrar-Gaines’s strong belief in interdisciplinary work.

They not only introduce students to materials, but offer exposure to a variety of STEM fields—just like the ones that Farrar-Gaines herself is involved in. The workshops involve hands-on experiments using equipment and materials from varying fields and emphasize the team skills and interdisciplinary cooperation necessary for scientific advancement in the modern world.

Perhaps more pertinent to the lives of high schoolers, the workshops focus on preparing students to think scientifically at the university level. They also equip students with relevant information associated with the college experience, which has proven to be very helpful—especially for those students who are the first in their families to attend a college or university.

“The workshops,” she said, “highlight alternate ways to obtain higher standards of living through pursuits in STEM—fields that are flourishing with opportunities in this technology-driven age.”

As to why Farrar-Gaines is so interested in teaching, she said, “I have learned that people often need to be encouraged that they have the ability to perform and achieve, even in the midst of adversities. Teaching allows me to help others see their giftedness.”

Farrar-Gaines has been recognized for her work with a MRS Woody White Service Award in 2013, an award that honors those who display “outstanding service and dedication on behalf of MRS as exemplified by Woody White, MRS President, 1984.”

She has also co-chaired a number of MRS technical symposia, chaired the Women in MS&E subcommittee, and received a first place award at the 2014 MRS Innovation Forum, where MRS members share their scientific ideas with broader audiences, and much like Farrar-Gaines’s work, a highly interdisciplinary space. She currently serves on the MRS Executive Board.

“I am extremely honored to have been recognized for my technical accomplishments and service to various organizations.” She views her commendations and awards as “a reminder to keep pressing onward,” to keep going—both in research and in outreach.

Farrar-Gaines hopes her outreach efforts can continue to influence generations of students for years to come. □



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