



A consideration of cross-disciplinary collaboration

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The Japan Society of Ultrasonics in Medicine (JSUM) is a sizeable society where medical researchers (including clinicians, technician, etc.), engineering researchers, and manufacturers of medical devices and pharmaceuticals work hand in hand with each other. In particular, the boundary between medicine and engineering is negligible compared to other relevant disciplines. One could say that one of JSUM's defining characteristics is that it spawns a variety of new technologies and findings through the fusion of medicine and engineering. I am sure our members are already aware of the above, but in this editorial I would like to go a little bit deeper into the concept of cross-disciplinary exchange.

I am a researcher in the area of basic research (engineering), but engineering can be further divided into a wide variety of fields. Taking the various applications used in ultrasonic diagnostic equipment as an example, the principles related to ultrasound physics, signal processing, imaging, and data processing, etc., and building the software each require a high level of expertise, and the design and production of the group of hardware needed to realize each process require different expertise. Recently, use of artificial intelligence (AI) technology in ultrasound has become popular, but this requires yet more experts in machine learning and deep learning, etc., which further improves the respective technologies. Those who research and develop ultrasound-related equipment are often very skillful people, and in many cases they learn the respective technologies on their own and investigate them in a comprehensive manner as a single group, but we should not forget the existence of experts who specialize in each elemental technology. Consequently, multiple researchers, corporations, and others work together to develop new technologies, with the aim being practical application in collaboration with clinicians.

A substantial synergistic effect can be achieved with collaboration between groups specializing in ultrasound, but completely unexpected results are often achieved by stepping out of one's bubble and talking with researchers (or with the end user in some cases) from other disciplines that may on the surface seem to be totally unrelated. As one example from my own experience, a brief chat I had with a researcher of computer vision led to research on treatment-support technology in which ultrasound images are projected on optical images or computed tomography images from multiple viewpoints in real time. I was surprised that an idea that was appealing in theory but seemingly difficult to achieve could be realized in a very short time, and it reminded me that one should go to a specialist for the best results.

Changing topics slightly, efforts aimed at diagnostic standardization are ongoing with respect to medical imaging modalities including ultrasound. Various cross-disciplinary exchanges are taking place as part of these investigations, as well, such as research groups studying ultrasound in a specific diagnostic domain, research groups studying ultrasound across multiple diagnostic domains, and research groups crossing multiple imaging modalities. I have also had the opportunity to participate in these activities, and as expected, a wide range of observations and opinions circulate in all such groups, eventually leading to a new shared awareness, which is a process that I find interesting. Moreover, it reminds me once again that there are different ways of looking at the same phenomenon depending on one's expertise or viewpoint.

JSUM supports many cross-disciplinary investigations and conference projects, and there are frequent interdisciplinary exchanges of opinions in both a narrow and broad sense. You just might discover something interesting if you take advantage of this excellent opportunity and occasionally turn your attention to a world that is totally outside your area of expertise.

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