

Journal of Biomedical Optics

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Medical Perspective Articles to Stimulate the Field for Needs-Finding

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The *Journal of Biomedical Optics* is the longest-lived beacon for publishing peer-reviewed papers in the field of optics in medicine and biology. This intersection between enabling technologies and medical needs is a complex one that requires an iterative two-directional approach to innovation and discovery. The two distinctly different cultures of medical professionals and optical scientist/engineers must come together to find useful intersections, where needs are met by solutions.

All too frequently the technical platform is the focus of an engineer, rather than the solution to a medical need. The overt focus on a technical platform, sometimes referred to as a “hammer in search of a nail,” often develops as an interesting technology in search of applications where it might have some value. We are predisposed to this perspective, because the SPIE community is deep in technical knowledge, having a membership comprised of the world’s leading minds in optics and photonics. In comparison, we can be considerably thinner on medical knowledge, simply because SPIE’s foundations are in engineering and physics, rather than the medical profession. Yet today, the optics and photonics community of SPIE includes many active members and contributors who are leading medical professionals, or work in the area of medical needs-finding. As such, we need to ensure that we use this knowledge base for the benefit of the community.

In response to this opportunity, the *Journal of Biomedical Optics* has created a new category of paper, invited from medical and/or professional experts who know where the needs are in their medical practice, or from regulatory or funding perspectives, and who are asked to articulate

these needs clearly in a perspective paper. The hope is that these articles will be a leading voice in the community of biomedical optics, helping bridge the gap between needs and solutions.

One of the very first things most engineering students learn is to work on “needs-finding” or “interviewing the customer” to evaluate what is working and what is not working. Without clearly defining the problem, it is not possible to logically work towards the solution. So, just as is done in introductory engineering classes or senior capstone design classes, biomedical optical engineers and scientists must at times interview the users to better help them focus on the goals. The greatest value of research is to discover a need that has never been articulated or described before, and then study it, characterize it, and possibly engineer a solution to it.

The authors of these perspective papers are explicitly asked to focus on the needs within their practice, where things are not working well, or where problems exist. The papers are not intended to describe technical solutions, because the solutions are the creative output that should come from SPIE members and constituents working on possible solutions. The challenges put forth in these perspectives will hopefully spur innovation in biomedical optics, similar to programs like the National Academy of Engineering’s *Grand Challenges for Engineering* program or the National Cancer Center’s *Provocative Questions* program. While this is a big goal, one thing is for sure: if people do not seek to find the intersections, then they will find neither unmet problems nor solutions. Solving these problems is not meant to be easy; rather, they are likely hard problems because many may not have obvious solutions. But the intent is to discuss and see what comes of a proper two-way discussion.

The very first of these articles appears in this issue of JBO, authored by Dr. Daipayan Guha, MD, and Dr. Victor Yang, MD, PhD, on the topic of spinal surgery, reviewing what has been done and what is needed in this very technical field of surgery [*J. Biomed. Opt.* **23**(6), 060601 (2018)]. In successive issues we will publish a series of these papers that cover different aspects of the health profession and its needs.

I encourage you to read these perspective articles in the current and upcoming issues of JBO, offer contributions where appropriate, and use these to stimulate a continuum of communication, which will advance the biomedical optics field.

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Editor-in-Chief