

From “old” photons to “new” photons: advancing new research in photonics and energy

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It is my pleasure to take over as the new Editor-in-Chief of the *Journal of Photonics for Energy* (JPE), following its founder Zakya Kafafi, who had the vision to establish an energy-focused journal in the SPIE portfolio ten years ago. I am also happy to be a part of SPIE, an organization that is dedicated to excellence in all of its activities, which bring together researchers and educators to disseminate their findings and thoughts to a global audience.

As I am sure is true for you as well, I have long been fascinated by photons. As a child, I would look up at the sunlight streaming through the leaves of a tree and wonder about its origin, its shimmering behavior, and its ethereal existence. That curiosity has never ended, and today I especially enjoy learning about work on the fundamental question of *what is a photon*¹—a topic of inquiry for SPIE publications throughout the years by thought leaders such as Carver Mead² and current SPIE President David Andrews.³ Of course, Nobel Laureate Willis Lamb was opposed to the concept of photons altogether (!),⁴ an important reminder that we should occasionally consider a drastically different point of view (or, at least, terminology).

Today, the role of the photon as a carrier of energy is perhaps its most important attribute. I always enjoy telling my undergraduate students in photovoltaics and renewable energy courses that the world is in the beginnings of a transition from using “old” photons to “new” photons as our primary energy source—a concept they seem to take equal delight in. In a sense, the title *Journal of Photonics for Energy* is redundant, as photonics can be thought of as the manipulation of energy in photon form.⁵ Systematic progress over the last several decades in our ability to control and characterize sophisticated nanoscale structures now allows us to build efficient solar energy harvesting devices, and to do so at a scale that can have a true impact on our energy systems. While silicon photovoltaics continues to rapidly progress along Swanson’s Law,⁶ there will always be a need for developing more inventive approaches to solar energy conversion with higher efficiency and better performance, driven by increasingly precise photon management. Beyond photovoltaics, photonics has crucial roles to play in other areas. For instance, radiative cooling from man-made structures—a topic of an open special section⁷—has enormous implications for our energy use.

As JPE moves forward, the associate editors, SPIE staff members, and I are committed to advancing new research in photonics and energy, and also to expanding the journal’s scope to incorporate new concepts from fields such quantum science and engineering, data science, and computation. We look forward to developing such content through new special issues and sections in the journal, and we seek your help in publishing, editing, and reviewing innovative ideas and results. I would also like to take this opportunity to [thank our reviewers over the last year](#), for the time and energy they have invested in this consummate method of information sharing that we all engage in via the publication and review process.

Lastly, I will state that as science and engineering are human endeavors, they are therefore tightly coupled to who we are, not just what we do. Including a diverse set of people in all of our activities is paramount for what we want to achieve. It is in our nature for researchers to push boundaries, and the same can be applied to societal change. To that end, JPE especially encourages involvement from people of diversity, in the form of manuscript submissions, reviewing, editorship, and suggestions for new directions. Your involvement, ideas, and energy will make JPE and the broader community that much more robust, creative, and productive toward advancing our collective goals.

References

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