Special Section Guest Editorial: Biomimetic Optical Microsystems

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The diverse optical structures and systems found in nature provide attractive design inspiration to solve a number of the prominent problems that we have been facing. Recent advances in micro- and nano-technology and materials engineering open up lots of opportunities for bioinspired optical microsystems. Many scientists and engineers have continuously pursued mimicry of biological optic systems to implement optically outstanding products, which have resulted in significant progress in sensors, optic components, biomaterials, displays, and imaging systems among others.

A biomimetic optical microsystem (BOM) is an applied subset of the optics/photonics field. It involves the design, fabrication, and utilization of optical materials/systems whose structure or functionality is inspired by what is found in nature. In this special section, we have three original papers for the BOMs. K. Kim et al. reported a new type of intraoral camera system inspired by the insect's compound eye. The proposed intraoral camera has superior imaging characteristics, which enables multi-functional dental imaging. Zyla et al. experimentally demonstrated biomimetic optical structures inspired by butterfly wings using two-photon polymerization. The optimized condition for two-photon polymerization provides unprecedented possibilities to explore the broad diversity of natural functional systems. D.H. Kim et al. reported compact zooming optical systems for panoramic and telescopic applications. The curved photoreceptor arrays in an animal's eye exemplifies an idea for reducing the complexity of optical systems. We hope that this special section would inspire new research directions and novel concepts in BOMs. Finally, we appreciate Editor-in-Chief Hans Zappe for his continuous support of this special section.

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