Editorial

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Once again it is my pleasure to welcome our readers to the March issue of 2014 of *Bioinspired, Biomimetic and Nanobiomaterials*. I would like to thank the readers for your continuing and constructive feedback and suggestions. The members of the Editorial Board and I thank the authors of this issue for their valuable contributions on topical themes of original research and rapid communications.

Plant surfaces in nature offer the cross-disciplinary research community a tremendous opportunity to mimic and replicate synthetic surfaces of variable chemistry, topography and dimensionality. This opens up great possibilities and opportunities to fabricate novel devices and structures for biomedical and other diverse sets of applications. A short communication by Mattaparthi and Sharma used *Canna indica* as a model plant to replicate high-aspect-ratio hierarchical structures of selected polymers.¹ The authors found close correlation in contact angle between the native seedpod and the as-fabricated structures with superhydrophobicity.

In nature, organomineral interactions of biomineralisation processes exhibit many elegant structures. In their short communication Hou *et al.* investigated the biomimetic synthesis of highly branched zinc oxide nanostructures with particular attention to inhibiting the rapidity of hydrolysis and condensation reaction thus controlling the growth of nanorod crystals.² The chemical mechanism has been discussed with further comments on possible improvement in energy conversion and purification applications.

Biotemplating has become an emerging area of research where nanoparticles can be synthesized by replicating the morphological characteristics and functionality of biological species. Chen *et al.* in their article successfully replicated the hierarchical internal structures of leaves of *Zea mays* Linn., known to be highly efficient in light harvesting, as a template to generate Au/N-TiO₂ nanocomposites.³ The authors presented the methodology and discussed mechanisms of the observed superior photocatalytic activity under solar radiation.

Butterflies have been a great source bioinspiration. As an example, this journal published for the first time an exciting article on wing inspired novel photoanode device.⁴ In this issue, Li *et al.* succeeded in biomimicking the hierarchical nipple array structure of compound eyes of the butterfly and reported experimental as well as simulated results on broadband antireflective properties of amorphous carbon nanocone arrays.⁵

The research by Mitachi *et al.* is based on the fact that the human eye can convert photons into high energy electrical signals by photoisomerisation.⁶ The authors fabricated retic acid based chitosan photoreceptive films using a self-assembly method and elucidated the mechanisms of the observed high quantum efficiency of photocurrent response of the fabricated biphotonic device.

Mechanical changes that occur during percutaneous vertebroplasty are complex and necessitate development of a numerical approach of analysis of pre- and post-operative clinical data of vertebrae. Deng and Li built a 3D geometrical model by segmentation and reconstruction of computed tomography images.⁷ The stress-strain distribution with respect to the dynamic changes in mechanical properties provides practicing clinicians and health professionals an insight into more effective control and management of osteoporotic fractures.

Atomic force microscopy (AFM) is an invaluable technique to characterize properties of nanoscale copolymers or lipid membranes. Liu, in this short communication, demonstrated the superior advantages of AFM over other optical methods to systematically probe the process of phase separation of liquids bilayer as a supported membrane.⁸ The approach is important to mimic models for microdomains or rafts in biosystems that play a significant role in sorting of proteins, signal transduction and regulation of cell growth.

Biomimetism based on marine organisms, such as fish, is an on-going and extremely inspirational area of current research. Development of advanced protective structures is of real interest to the defensive safety of population. The final short communication, by Allison *et al.*, investigated, for the first time, rostrum (paddle) of the paddlefish (*Polyodon spathula*) as a structural biofunctional system for bioinspiration.⁹ In addition, lightweight rostrum uniquely offers sensory, hydrodynamic and strength properties. The authors presented various characterization results to elucidate the structure-property relationship in terms of a constitutive materials model.

Enjoy the content of this issue and I look forward to continuing to serve the community by publishing your research articles, reviews and communications. Suggestions from you are always welcome in the promotion and advancement of the topics this journal covers.

REFERENCES

1. Mattaparthi, S.; Sharma, C. S. Biomimicked high-aspect-ratio hierarchical superhydrophobic polymer surfaces. *Bioinspired, Biomimetic and Nanobiomaterials* **2014**, 3(1), 4–9.
2. Hou, W.; Lancaster, L.; Li, D.; Bowlus, A.; Bozhilov, K.; Kisailus, D. Biologically inspired synthesis of highly branched zinc oxide nanowires. *Bioinspired, Biomimetic and Nanobiomaterials* **2014**, 3(1), 10–18.
3. Chen, J.; Huilan Su, H.; Deng, T.; Zhang, W.; Lau, W. M.; Zhang, D. Bioinspired Au/N-TiO₂ photocatalyst templated from *Zea mays* Linn. leaves. *Bioinspired, Biomimetic and Nanobiomaterials* **2014**, 3(1), 19–28.
4. Han, J.; Su, H.; Zhang, W.; Chen, Y.; Gu, J.; Zhang, D.; Moon, W. J. Unique reflection properties of CdS/butterfly wings nanocomposites. *Bioinspired, Biomimetic and Nanobiomaterials* **2012**, 1(1), 38–47.
5. Li, T.; Lou, S.; Ding, J.; Fan, T. Antireflective amorphous carbon nanocone arrays inspired from compound eyes. *Bioinspired, Biomimetic and Nanobiomaterials* **2014**, 3(1), 29–37.
6. Mitachi, S.; Tsuchida, Y.; Nishimura, K. Response of biophotonic device using retinoid. *Bioinspired, Biomimetic and Nanobiomaterials* **2014**, 3(1), 38–44.
7. Deng, J.; Li, H. The analysis of mechanical changes of following percutaneous vertebroplasty. *Bioinspired, Biomimetic and Nanobiomaterials* **2014**, 3(1), 45–57.
8. Liu, R. Atomic force microscopic study on lipid bilayer nanoscale phase separation. *Bioinspired, Biomimetic and Nanobiomaterials* **2014**, 3(1), 58–62.
9. Allison, P. G.; Deang, J. F.; Diaz, A. J.; Poda, A. R.; Hoover, J. J.; Horstemeyer, M. F.; Perkins, E. J. Characterization of paddlefish (*Polyodon spathula*) rostrum stellate bones. *Bioinspired, Biomimetic and Nanobiomaterials* **2014**, 3(1), 63–68.