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From material to biotechnology applications of structural DNA nanotechnology

In recent years, DNA has been used as an ideal substrate for the engineering of versatile nanostructures and nanomachines due to its well characterized conformation and predictable self-assembly. Using non-overlapping sticky-end cohesion, DNA nanostructures can be modified in a number of ways for the site-directed spatial arrangement of functional guest components such as proteins, metal nanoparticles, and small molecules with high accuracy. This talk will review the state of DNA nanotechnology including DNA-based sensors, DNA-actuated enzyme nanoreactors, fluorescence-force measurements of motor proteins on DNA origami platforms, and other emerging biotechnological applications of one-, two- and three-dimensional DNA nanostructures.

Speaker Biography

Soma Dhakal has completed his Ph.D from Kent State University, USA in 2013. After three years of postdoctoral research at the University of Michigan, he joined Virginia Common Wealth University (VCU), USA as an Assistant Professor in the Department of Chemistry where he started his state-of-the art DNA nanotechnology lab. His research is highly interdisciplinary which spans from DNA nanotechnology to single-molecule DNA/protein biophysics and aptamer-based single-molecule sensing. The main research theme of his group is to exploit the programmability of DNA nanostructures for both material as well as biological applications. He is co-author of a book chapter and several publications in high-impact scientific journals. His work has been featured in news outlets such as Nature News and Views, C&EN News, and Phys.Org. He has served as a peer reviewer for several reputed journals and funding agencies.

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