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SYNTHETIC BIOLOGY MEETS STRUCTURAL BIOLOGY: FROM PROTEIN COMPLEX STRUCTURES TO SYNTHETIC VIRAL NANOSYSTEMS

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Synthetic biology is the engineering of biology which enables a rational, bottom-up approach to design and construct artificial biological systems as well as the redesign of existing natural biological systems. Structural biology is the elucidation of molecular mechanisms of natural and artificial biological architectures, ideally at atomic resolution. Structural biology has drawn immense benefit from engineering and design, notably for the recombinant synthesis of biological specimens as objects of study. Recombinant technology relies on the delivery of customized, active biological circuits comprising of functionally

arranged synthetic genetic material and regulatory elements into a variety of natural and engineered host organisms as the chassis. Synthetic biology approaches hold enormous promise to decisively advance structural biology in academic and industrial research and development programs, by accelerating all steps of circuit design, assembly and delivery, and enhancing available chassis by targeted engineering. Recent developments, their applications and potential for investigating the structure and function of complex multiprotein assemblies will be discussed.

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