

Rapid assembly of gene variant libraries and multi-gene pathways with semiconductor technologies

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Engineering synthetic biological systems requires the design, build and testing of multi-gene networks. To optimize a synthetic system with the best combination of DNA parts, synthetic biologists need to test all possible variations of individual components and be able to screen in a combinatorial design space. But such combinatorial engineering approaches are hindered by the difficulty of simultaneously assembling numerous large, multi-gene constructs from a collection of DNA parts.

Here, we introduce our newly developed variant library synthesis platforms, which creates well-designed mutant libraries containing all desired variants with unbiased distribution. Additionally, our combinatorial library synthesis platform enables in-parallel construction of thousands of multiplexed gene variants in an efficient and economical way. Both platforms utilize our patented semiconductor-based oligonucleotide microarray fabrication technology allowing complete control over codon usage and amino acid distribution. Libraries generated using this method are highly customizable and capable of generating over 1×10^8 variants. As a result, our platform enables faster, easier, and more cost-effective engineering of metabolic pathways and microbial strains in comparison to alternative approaches.

Biography

Dr. Cedric Wu obtained his PhD degree in Cellular and Molecular Biology from University of Wisconsin - Madison. He received post-doc training in nucleic acid, surface and analytical chemistry. Dr. Wu possesses more than twenty years of combined experience working in academia, government and industry. He invented and

published more than 20 articles and patents, as well as numerous trade secrets, including nucleic acid microarray fabrication technologies and gene assembling methods. He, currently, is leading the R&D department in GenScript focusing on novel DNA synthesis, long and pathway DNA assembly, codon optimization, DNA microarray fabrication, oligo pool synthesis and automation process development