About our guest
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Biologically removing the forever from "forever chemicals"

Season 3, Episode 5

Episode notes

It could be argued that biology has always boiled down to chemistry, and that chemistry has always boiled down to physics. However, not many would deny that the fields of biology and chemistry are overlapping more than ever, with both leveraging computing methods, also more than ever.

This conversation with Dr. Ramesh Jha, Technical Staff Member at Los Alamos National Laboratory (LANL), crosses biology, chemistry, and computing methods. The work of his biome team at LANL uses computational tools to inform the design of enzymes that are produced via PCR-based cloning and then expressed in microbes. They use fluorescent gene circuits in these microbes, along with flow cytometry, to screen these large libraries for advantageous gain-of-function variants. When they find an interesting mutation, they isolate it, sequence it, and produce and evaluate those biocatalytic enzymes for bioremediation, biomanufacturing, and other important applications. Ramesh makes this complex and interdisciplinary science approachable and gives hope to how it could help address problems of "forever chemicals" and other environmental and manufacturing challenges. Join us for this interesting and inspiring conversation.

Ramesh's recent publications

1. Shin SM, Jha RK, Dale T. Tackling Catch-22 situation of optimizing a sensor and transporter system in a whole cell biosensor design for an anthropogenic small molecule. ACS Synthetic Biology (2022), 11(12), 3996.
2. Jha RK, Strauss CEM. Smart microbial cells couple catalysis and sensing to provide high throughput selection of an organophosphate hydrolase. ACS Synthetic Biology (2020), 9(6), 1234-1239

> "Finding an environmental problem, understanding the chemistry, and then using these kinds of, you know, biological source materials, which could be enzymes or the whole microbial cell itself, to actually perform those functions has been the key area. And I think that the environmental problem, or the research problem itself is so huge that blending some of those different areas would be kind of very important."

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