

PAGE MORTON HUNTER DISTINGUISHED SEMINAR SERIES



ENGINEERING A POLYMER ZOO OF THERAPEUTICS FOR INFECTIOUS DISEASE AND CANCER

The pharmaceutical industry has delivered an ever-emerging repertoire of disease therapies. We need to work together to make sure these drugs are more equitably available in our own setting and globally, and to meet the special needs of those experiencing racial, ethnic, social, and economic inequities. These considerations give rise to important challenges that engineers are well suited for. I will give an overview of therapeutic case studies with the hope of further motivating such pharmaceutical bioengineering.

SARS-CoV-2 has demonstrated the threat of newly emerged pulmonary pathogens to rapidly disseminate in an exposure-naïve world. Pulmonary infections take a horrible toll around the world with diseases such as Covid-19, tuberculosis, and melioidosis. We have developed a “drugamer” therapeutic platform that exploits the lung macrophage as a reservoir for extending antibacterial and antiviral drug dosing.

A related therapeutic platform addresses malaria and HIV – diseases that remain two of the world’s greatest scourges. We have recently reported a new liver-targeted therapeutic for Plasmodium vivax infections that cause recurrent malaria. We have also reported a new long-acting drug depot designed for the special needs of global PrEP.

Finally, we have been exploiting this platform for new applications in cancer immune-therapies, where the focus is on bringing together the three pillars of cell therapy, proteins, and small molecule drugs.

Patrick Stayton, Ph.D.



*Professor, Department of Bioengineering
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Patrick Stayton serves as the Distinguished Career Professor in Bioengineering. He received his B.S. in Biology from Illinois State University, his Ph.D. in Biochemistry from the University of Illinois, and was a Postdoctoral Research Associate at the Beckman Institute. Dr. Stayton is the founding Director of the Institute for Molecular Engineering and Sciences.

His eclectic research group works at the interface of fundamental molecular science and applied molecular bioengineering. He is a co-founder of the three startup companies including the public stage company PhaseRx Inc. based on his group’s RNA delivery work.

Dr. Stayton is a Fellow of AIMBE, and was awarded the Clemson Award from the Society For Biomaterials. He served as Co-Chair of the Gordon Conference on Drug Carriers in Medicine and Biology, has been awarded the College of Engineering’s Faculty Innovator Award, and the Distinguished Teacher and Mentor Award from Bioengineering.

February 16, 2023 • 3:30 p.m.

Location:
108 Watt Auditorium



Department of
BIOENGINEERING
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