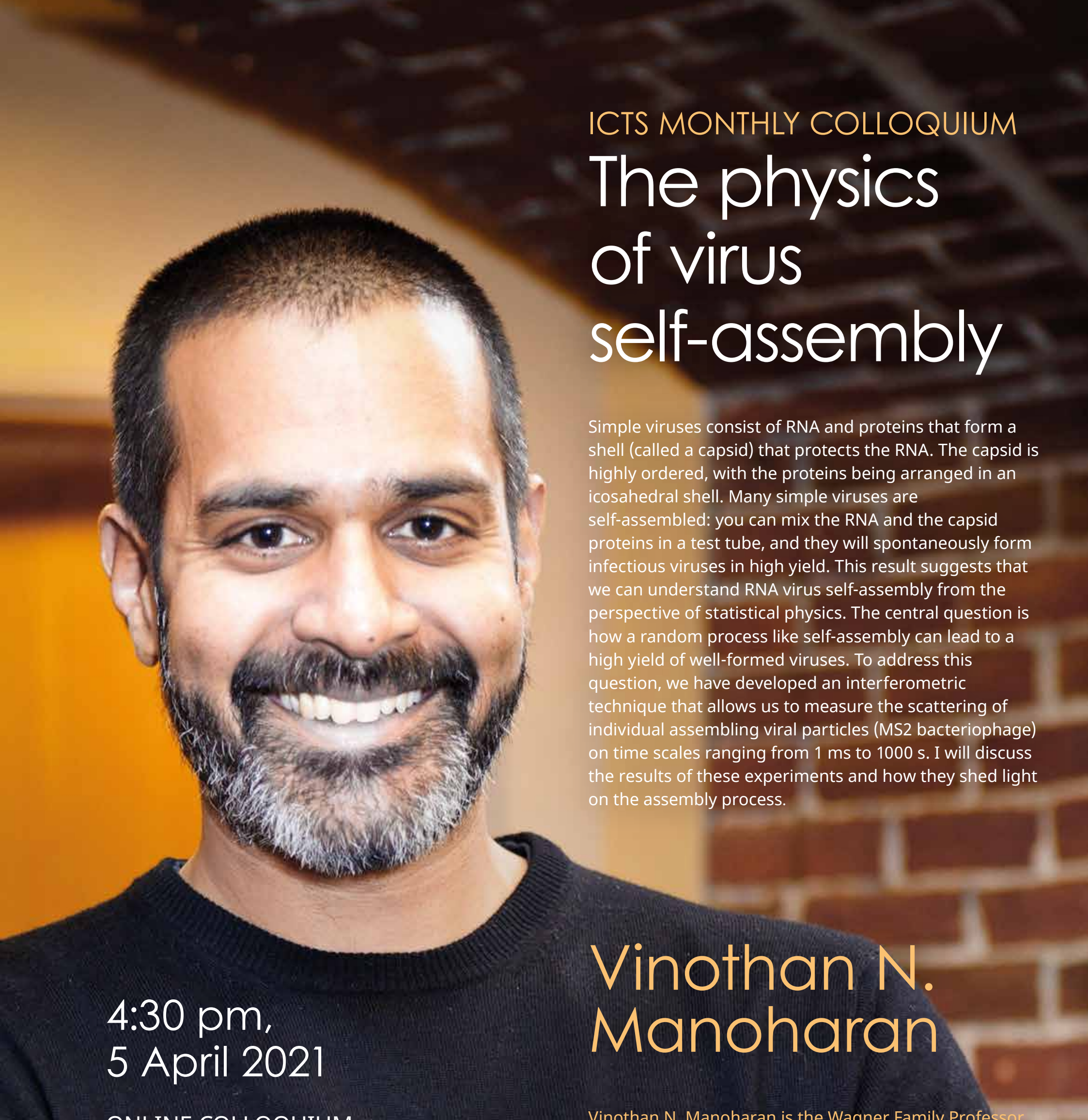

ICTS MONTHLY COLLOQUIUM

# The physics of virus self-assembly

Simple viruses consist of RNA and proteins that form a shell (called a capsid) that protects the RNA. The capsid is highly ordered, with the proteins being arranged in an icosahedral shell. Many simple viruses are self-assembled: you can mix the RNA and the capsid proteins in a test tube, and they will spontaneously form infectious viruses in high yield. This result suggests that we can understand RNA virus self-assembly from the perspective of statistical physics. The central question is how a random process like self-assembly can lead to a high yield of well-formed viruses. To address this question, we have developed an interferometric technique that allows us to measure the scattering of individual assembling viral particles (MS2 bacteriophage) on time scales ranging from 1 ms to 1000 s. I will discuss the results of these experiments and how they shed light on the assembly process.

## Vinothan N. Manoharan

4:30 pm,
5 April 2021

ONLINE COLLOQUIUM
Zoom link - https://bit.ly/ictsMCapr21

Meeting ID : 916 7933 2668
Passcode : 744358

Vinothan N. Manoharan is the Wagner Family Professor of Chemical Engineering and Professor of Physics at Harvard University. His research focuses on understanding how systems containing many particles suspended in a liquid -- such as nanoparticles, proteins, or cells -- organize themselves into ordered structures like crystals, viruses, and even living tissues. His lab uses optical microscopy and holography to watch these systems self-assemble in real time. The goal is to discover new, general physical principles that underlie complex systems and to apply these principles to practical problems in materials science, nanotechnology, and medicine. Manoharan received his Ph.D. from the University of California, Santa Barbara in 2004 and worked as a postdoctoral researcher at the University of Pennsylvania before arriving at Harvard in 2005.

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